GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

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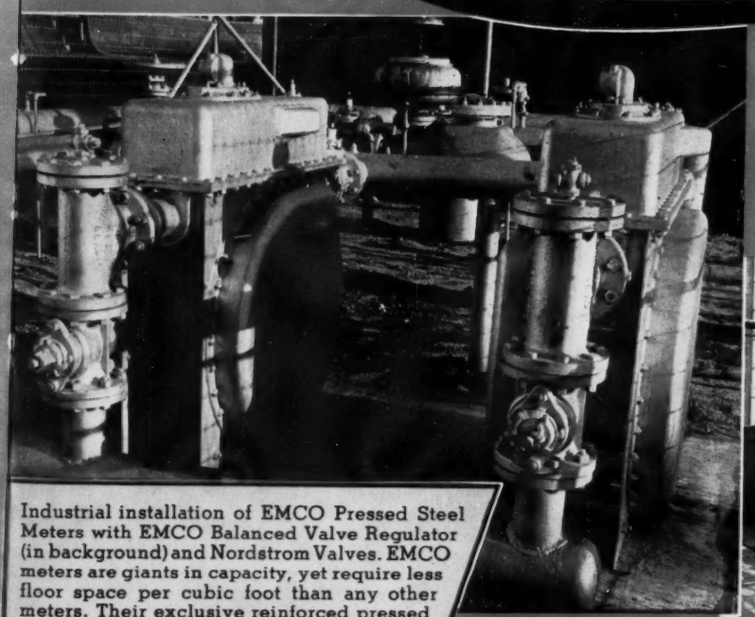
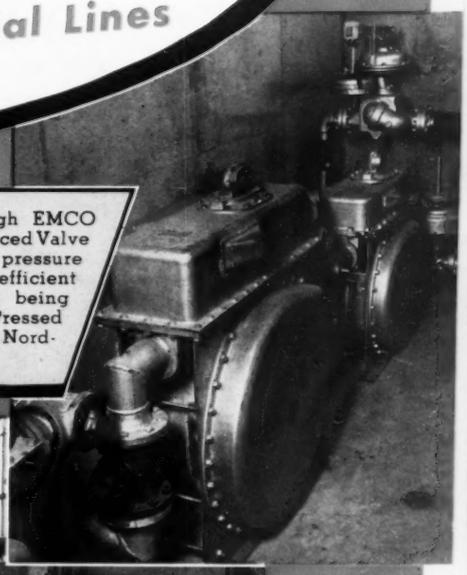
PERIODICAL DIVISION

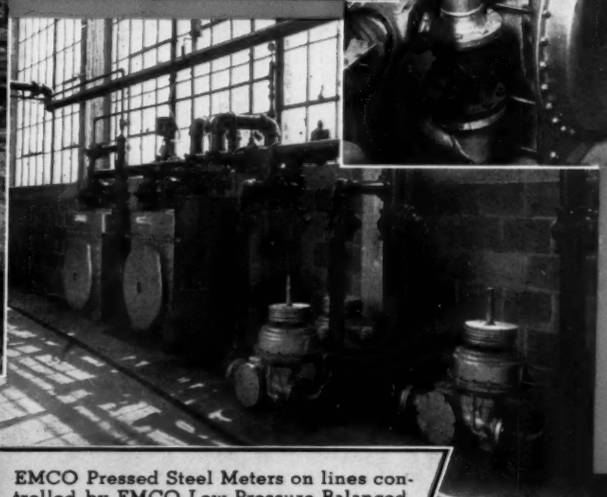
EMCO LARGE CAPACITY PRESSED STEEL METERS
..... EMCO BALANCED VALVE REGULATORS
..... NORDSTROM LUBRICATED PLUG VALVES
First Choice for Industrial Lines



Industrial installation of EMCO Pressed Steel Meters with EMCO Balanced Valve Regulator (in background) and Nordstrom Valves. EMCO meters are giants in capacity, yet require less floor space per cubic foot than any other meters. Their exclusive reinforced pressed steel construction makes them extremely rugged and light in weight.

Two-stage regulation through EMCO High and Low Pressure Balanced Valve Regulators reduces the line pressure of the gas to a constant, safe, efficient utilization pressure before being measured by these EMCO Pressed Steel Meters. All lines are Nordstrom Valve controlled.





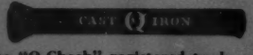
EMCO Pressed Steel Meters on lines controlled by EMCO Low Pressure Balanced Valve Regulators and Nordstrom Valves. Note the neat, compact installation this equipment makes possible. Nordstrom Valves on all lines assure quick, easy operation and positive shutoff.

PITTSBURGH EQUITABLE METER COMPANY
MERCO NORDSTROM VALVE CO.
NEW YORK · BUFFALO · PHILADELPHIA · KANSAS CITY · TULSA · LOS ANGELES · *Main Offices* · PITTSBURGH, PA. · DES MOINES · CHICAGO · COLUMBIA · MEMPHIS · OAKLAND · HOUSTON

MAY 1940 ◆ ◆ 25 CENTS

Tight as a miser!

Hundreds of installations of mechanical-joint cast iron pipe throughout the nation, during the past decade, have demonstrated that the *stuffing-box type joint,* as made by members of this Association, is *bottle-tight under high operating pressures.* These joints are quickly and easily assembled. They allow ample deflection as well as longitudinal expansion or contraction.



Look for the "Q-Check" registered trade mark. Cast iron pipe is made in diameters from 1¼ to 84 inches.

THE CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1013 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

Unskilled labor and a wrench suffice for speedy and permanently tight assembly of the stuffing-box type mechanical joint for gas mains. Made by CIPRA members in several designs based on the same principle.

"Defender" available in sizes ½" to 1½" I.P.S. gas lines.

Even The Best Thermostat Needs A KITSON Emergency Shut-Off Gas Valve

Relief valves on automatic gas water heaters are insurance against thermostat trouble. There are, of course, degrees of insurance—partial to complete.

The KITSON EMERGENCY SHUT-OFF Gas Valve (Type IHF) is complete insurance, because *it shuts off the main gas supply before any physical damage can be done, and keeps it shut off until the cause of the thermostat trouble can be removed.*

Thus, positive protection is assured against the stress on tanks, flooded basements and other dire consequences possible in an over-heated domestic water system.

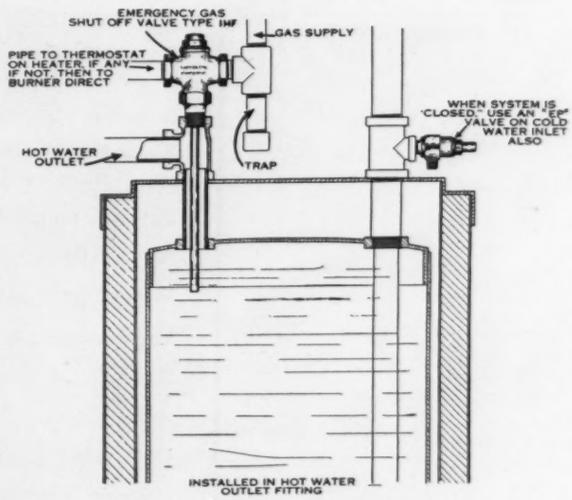
Positive Protection

The KITSON "Defender" Emergency Shut-Off Gas Valve can be installed through the hot water outlet in direct contact with the heated water at the top of the tank. Note the long stem insuring that the chemical fuse within is in direct thermal contact with the water in the hottest zone at the top of the tank.

Immediately the temperature of the water reaches its safety limit beyond the set shut-off temperature of the thermostat, the chemical fuse melts, and the valve shuts tight, cutting off the main gas supply to the water heater burner. *The real protection therefore is that it puts the finger on a faulty thermostat.*

Simply and quickly the chemical fuse cartridge can be renewed when the thermostat trouble is repaired.

The KITSON "Defender" Emergency Shut-Off Gas Valve offers positive and complete protection for automatic water heating. That is why many gas companies specify it as standard equipment.


EMERGENCY GAS SHUT OFF VALVE TYPE IHF
GAS SUPPLY
PIPE TO THERMOSTAT ON HEATER, IF ANY IF NOT, THEN TO BURNER DIRECT
WHEN SYSTEM IS "CLOSED," USE AN "EP" VALVE ON COLD WATER INLET ALSO
HOT WATER OUTLET
TRAP
INSTALLED IN HOT WATER OUTLET FITTING

A.G.A. APPROVED

Prove it for yourself. We will be glad to send any gas company a sample of the KITSON "Defender" for examination and test. Be sure to specify the size. Also, ask for Catalog "A" covering the complete line of Kitson gas industry brass fittings.

KITSON COMPANY
2409-15 Westmoreland St., Philadelphia, Pa.
Manufacturers of Kitson Safety Controls for manual and automatic Water Heaters . . . Quality Brass Goods for Gas, Water and All Plumbing Uses.

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GAS

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Sixteenth Year of Publication

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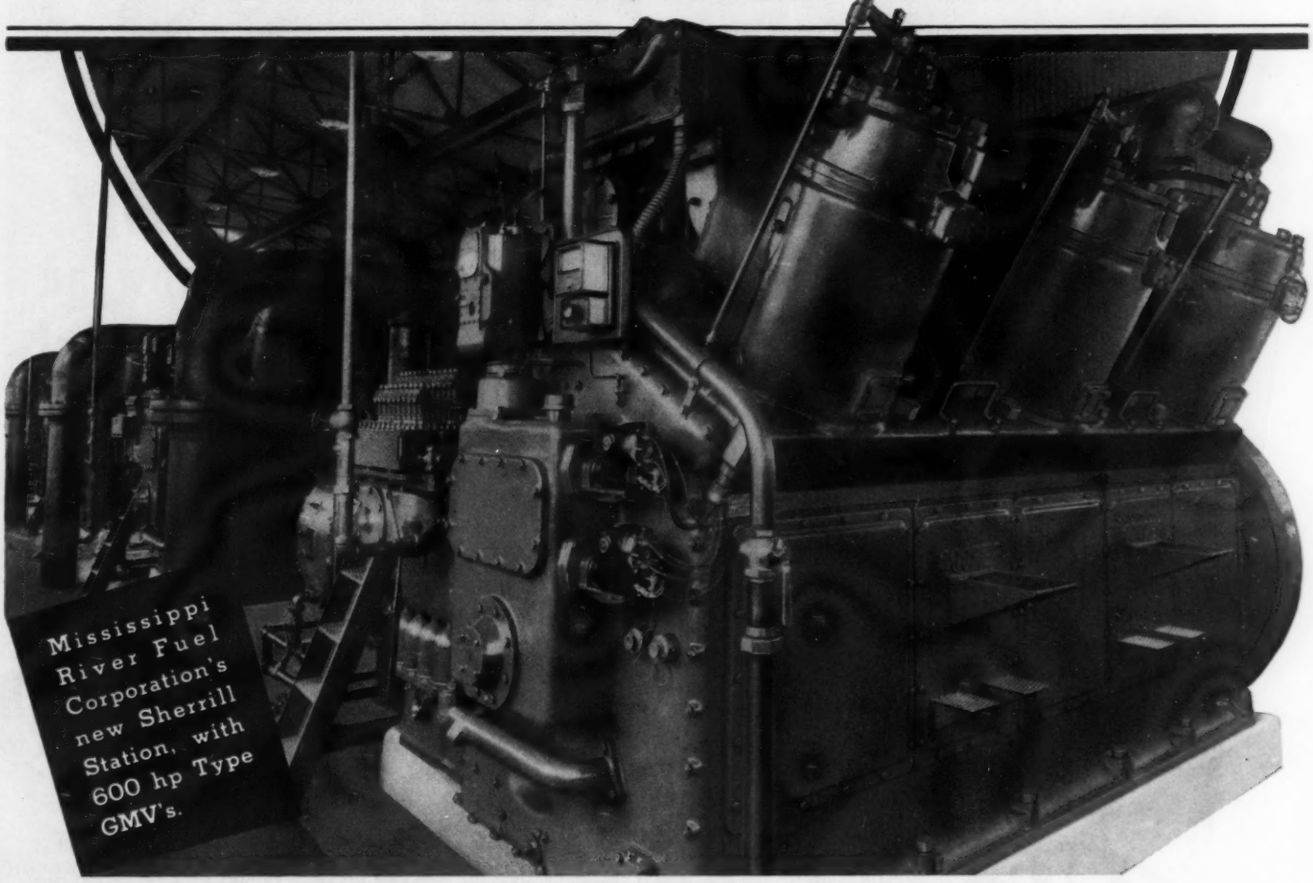
What Gas Transportation Companies want . . .

TYPE GMV ANGLE 's HAVE!

Here's what gas transportation companies demand of the compressor equipment that goes into their stations:

1. **Compressors which can be swiftly transported, quickly installed, and immediately put into full load service . . . to promptly answer increased demands for gas.**
2. **Compressors which are compact . . . to save foundation and housing costs.**
3. **Compressors which are medium speed and rugged . . . to assure steady service, long life, and minimum maintenance costs.**
4. **Compressors with every modern feature for economical operation and dependable 24 hour service . . . to better serve their customers *and their stockholders.***

TYPE GMV 's ARE THE LOGICAL ANSWER!



Mississippi River Fuel Corporation's new Sherrill Station, with 600 hp Type GMV's.

THE COOPER-BESSEMER CORPORATION

640 EAST 61st STREET . . . LOS ANGELES, CALIFORNIA

25 West 43rd Street, New York City Mills Building, Washington, D. C. 631 Spring St., Shreveport, Louisiana 201 East 1st St., Tulsa, Oklahoma
Magnolia Building, Dallas, Texas 529 M & M Building, Houston, Texas
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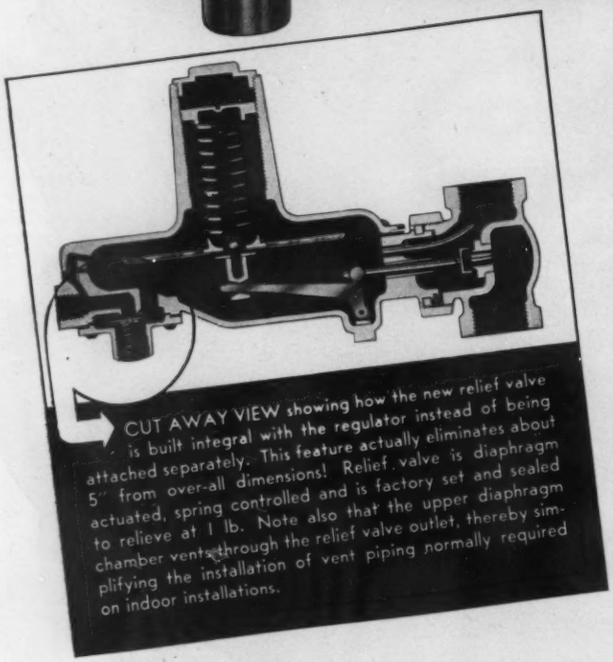
New FISHER GAS SERVICE REGULATOR with BUILT-IN RELIEF VALVE

Type 733A



CUT AWAY VIEW showing how the new relief valve is built integral with the regulator instead of being attached separately. This feature actually eliminates about 5" from over-all dimensions! Relief valve is diaphragm actuated, spring controlled and is factory set and sealed to relieve at 1 lb. Note also that the upper diaphragm chamber vents through the relief valve outlet, thereby simplifying the installation of vent piping normally required on indoor installations.

Safety relief valve now an integral part of regulator!

This sensational new feature means that you obtain a much more compact unit — a regulator which is complete in itself!

The Type 733A House Service Regulator also provides many other outstanding advantages. More sensitive regulation, larger capacities, more economical operation are just a few.

Valve discs and orifices are both renewable without special wrenches, and without breaking any pipe joints. Valve bodies are interchangeable, thus eliminating the need of carrying all sizes of regulators in stock. Constant reduced pressure is assured by the curved control tube, even though flow demand may be high.

Fisher diaphragms are highly sensitive — yet extremely tough. They are made of a special composition impervious to gases. There are no pores for gas to seep through as in leather.

Type 733A Fisher Regulator is available only in sizes ¾", 1" and 1¼". It is suitable for initial pressures up to 150 lbs., and is recommended for reduced pressure ranges of 2 to 10" W.C., and 7 to 16" W.C.

FISHER GAS REGULATORS are individually built to meet your exact operating conditions

WRITE TODAY for prices and complete details concerning this remarkable new regulator

FISHER GOVERNOR COMPANY

804 Fisher Bldg. Marshalltown, Iowa

A PRACTICAL ANSWER TO AN OLD PROBLEM

El Paso Natural Gas Company...1939 program... 100% protected by Barrett Enamel

Barrett PIPELINE ENAMEL

OUR customers' experience under a great variety of conditions constantly demonstrates the superior ability of Barrett Enamel to resist the destructive effect of soil action to coated pipe.

A practical solution to the problem of soil stress that varies with different soils . . . with changes in moisture content . . . with temperature . . . can be found by specifying Barrett Pipeline Enamel.

Together, these features point to the immediate and future economy to be gained by using Barrett Enamels for all underground and underwater construction. The Barrett Company maintains a Pipeline Service Department to assist you in all protection problems, and welcomes your inquiries.

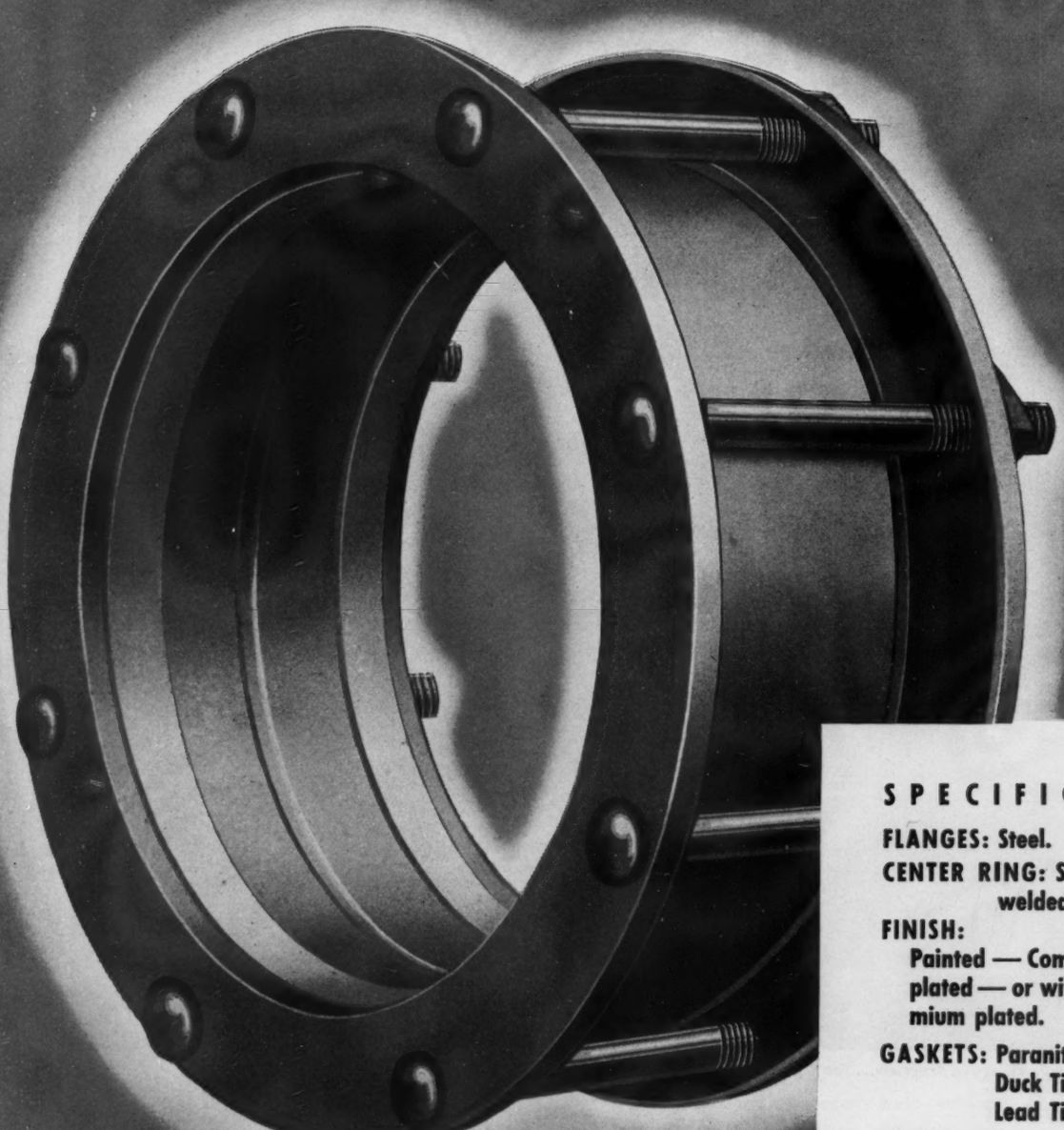
THE BARRETT COMPANY, 40 RECTOR STREET, NEW YORK, N. Y.

FIELD SERVICE

•

A Pipeline Service Department and Field Service men are provided by Barrett to assist engineers in the use of Barrett products. Inquiries are invited.

THE *Dayton* No. 1 Coupling



SPECIFICATIONS

FLANGES: Steel.

CENTER RING: Steel—electrically welded.

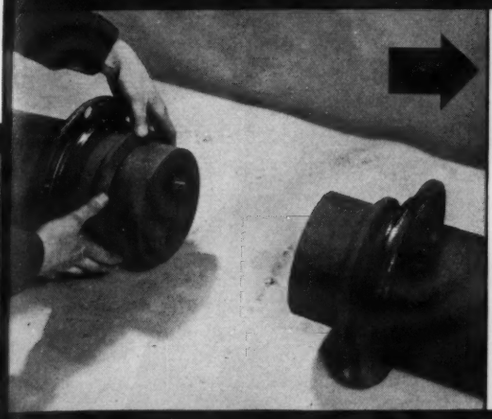
FINISH:
Painted — Completely cadmium plated — or with bolts only cadmium plated.

GASKETS: Paranite C or M.
Duck Tipped.
Lead Tipped.

THE NATIONAL

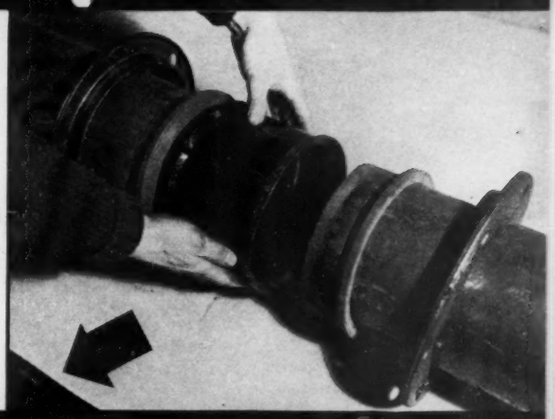
DAYTON COUPLING DIVISION....

Time Saving

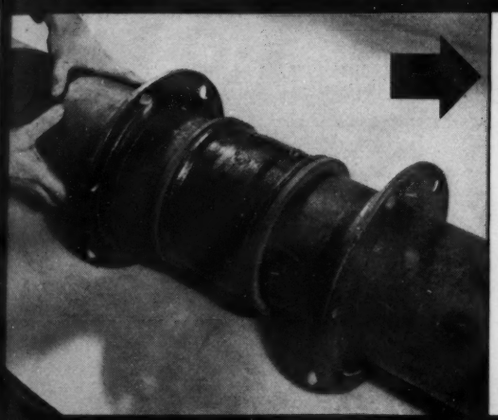


The simplicity of design of the Dayton No. 1 and its uniformity of construction thru quality control during manufacture, eliminates many of the costly time consuming delays often encountered in coupling installations.

A DAYTON COUPLED LINE IS A *QUICKLY COUPLED* LINE



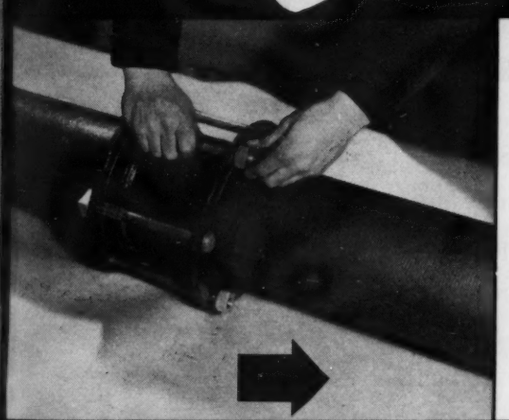
Labor Saving



Expensive skilled labor is unnecessary to install the Dayton No. 1. Unskilled labor readily understands its simple design and, having no "misfits" to contend with, quickly and efficiently installs it with only a socket wrench.

A DAYTON COUPLED LINE IS AN *ECONOMICALLY* COUPLED LINE

Increased Profits



Frequent terminations in line service for repairs obviously increases the costs of maintenance and decreases operating profits. The Dayton No. 1 is a "true fitting" coupling capable of rendering a tight and flexible pipe joint indefinitely.

A DAYTON COUPLED LINE IS A *PROFITABLE* LINE

ONAL SUPPLY COMPANY

....GRANT BUILDING • PITTSBURGH, PA.

U.S. cast iron PIPE

CAST IRON pit-cast pipe and cast iron Super-deLavaud centrifugally cast pipe are manufactured by this Company in our plants at Burlington, New Jersey; Bessemer and Birmingham, Alabama; and Chattanooga, Tennessee—where large stocks of pipe and standard fittings are available for prompt shipment. Smaller shipments can be made quickly from 14 shipping points throughout the country.

U. S. PIPE AND FOUNDRY CO.
General Offices: Burlington, N. J.
Plants and Sales Offices Throughout the U. S. A.

SERVICE CONNECTIONS *in 5 simple steps*

Connect service pipe.

Screw in Service Tee, or Tee and Swing Elbow, whichever is your practice.

Clean main. Bolt saddle in place, tapping boss with heavy hammer to seat lead, then pull up tight on bolt.

Drill hole in main, using Skinner-SEAL Drill Device, or other standard equipment.

Screw in plug.

WITH SKINNER-SEAL SERVICE SADDLE!

★ ANYONE can make tight, lasting service connections, quickly, easily—in 5 simple steps, with SKINNER-SEAL Service Saddles. Made in all sizes from 1" to 12" inclusive, for use on both steel and cast iron mains. Many thousands used yearly.

Made of malleable iron, the improved design—with one bolt—is of utmost simplicity and strength. Wide hinge and web construction centralizes pressure on gasket . . . single large bolt saves time and gives a uniform seating to the gasket. Full bearing protects pipe—prevents tilting at top while installing or while in service.

Lead, or Neoprene, gasket is riveted direct to pressure platform! Each saddle tested to 75 lbs. pressure.

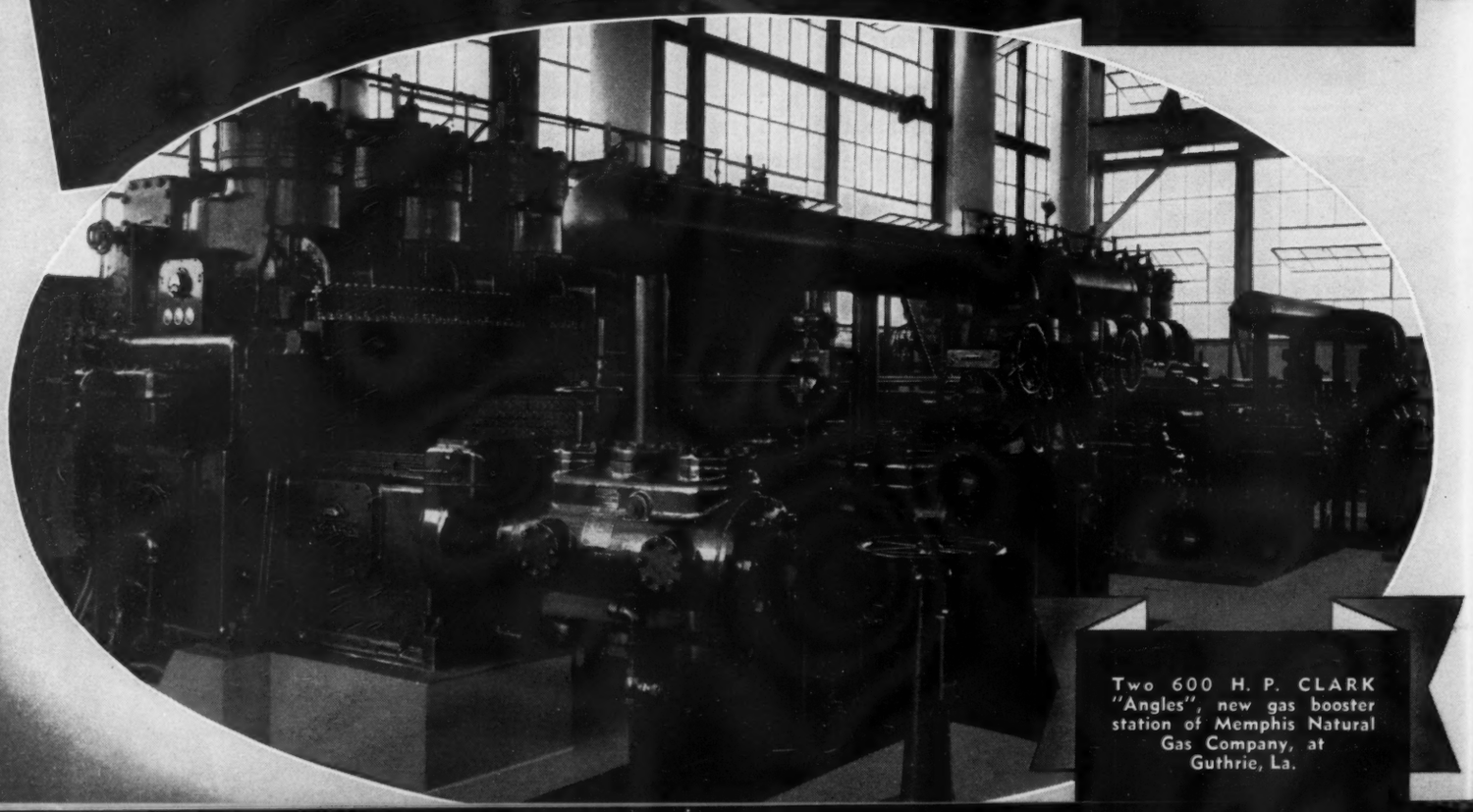
WRITE FOR catalog. Bulletin on other Skinner Service Fittings also available on request.

M. B. SKINNER CO. *Est. 1898* **SOUTH BEND, IND.**

RECENT GAS PIPEL

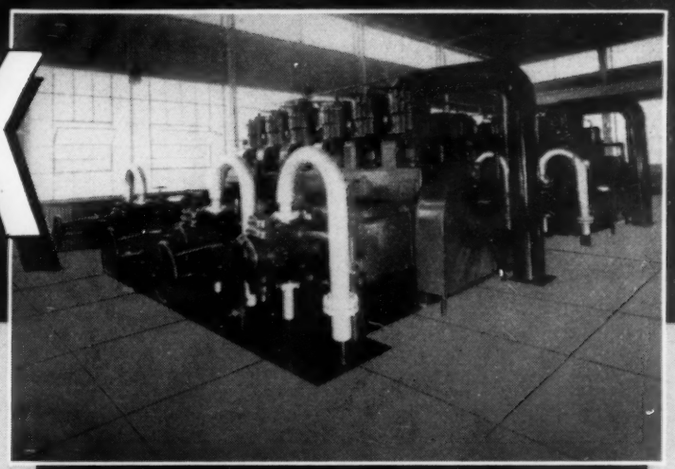
AWARDE

Three 400 H. P. CLARK "Angles", new gas booster station of Consolidated Gas Utilities Corp., Twitty, Texas



Two 600 H. P. CLARK "Angles", new gas booster station of Memphis Natural Gas Company, at Guthrie, La.

ELINE CONTRACTS
DED CLARK



Two 600 H. P. CLARK "Angles", new gas booster station of Panhandle Eastern Gas Company, at Tuscola, Ill.

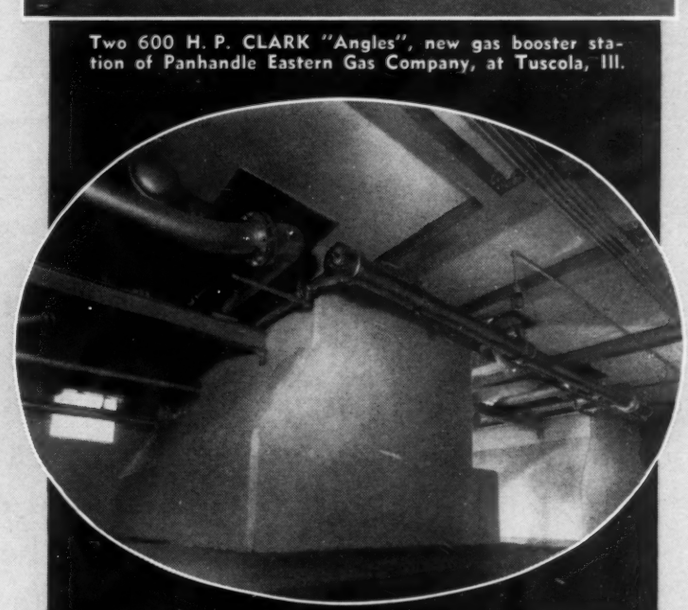
THE CLARK "Angle" is proving the ideal compressor unit for gas booster stations, offering new important economies. A number of leading gas companies, after trying CLARK "Angles" for one installation, have already built their second and third CLARK-Angle-equipped stations.

The installation shown at bottom of opposite page represents one of two "repeat orders" from a leading company. In 1937 the Memphis Natural Gas Company installed five 600 H. P. CLARK "Angles" in its Wilmot, Arkansas, main-line booster station. Early in 1939 this company's new Guthrie, Louisiana, station was equipped with the two 600 H. P. CLARK "Angles" shown. And the company has just completed a third station, at Lulu, Mississippi, equipped with one 600 H. P. CLARK "Angle."

New gas pipe line installations of Consolidated Gas Utilities Corporation and Panhandle Eastern Gas Company are also shown here, while two other new installations not pictured are those of Colorado Interstate Gas Company at Canon City, Colorado, consisting of one 600 H. P. unit, and of the Canadian River Gas Company, at Dalhart, Texas, consisting of four 600 H. P. machines.

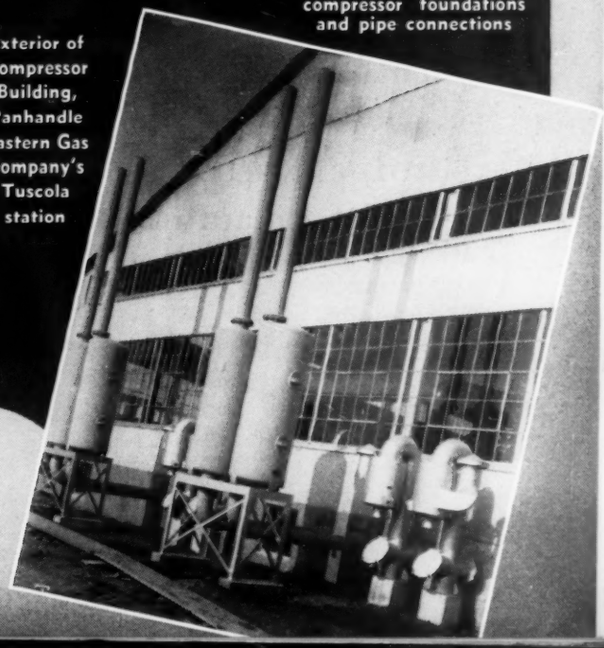
CLARK "Angles," while equalling in efficiency and dependability the older horizontal-type compressors, have introduced 4 important economies, viz: Lower transportation and erection costs; smaller foundations and floor space; fuel saving due to CLARK Super-2-Cycle Fuel Injection; lower maintenance due to extreme simplicity of design.

If you will need increased booster facilities in 1940, now is the best time to plan for this expansion. Investigate the facts about CLARK "Angle" savings. Our engineers are at your service.



Basement under Compressor Room, Panhandle Eastern station, showing compressor foundations and pipe connections

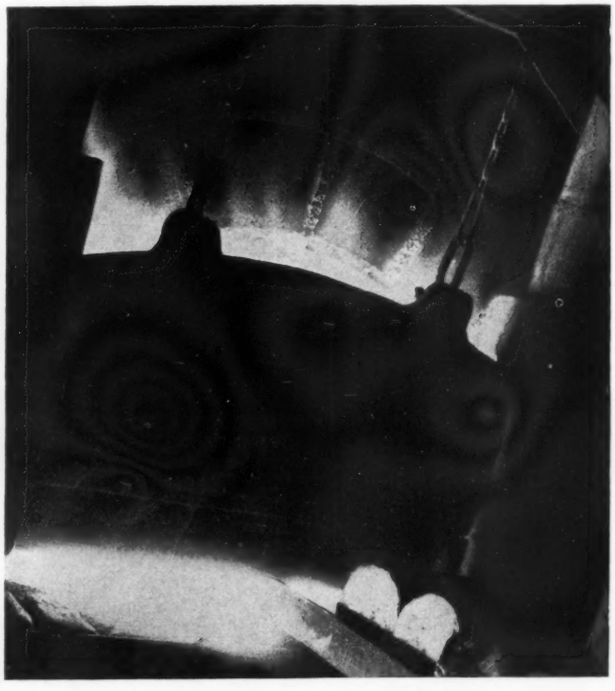
Exterior of Compressor Building, Panhandle Eastern Gas Company's Tuscola station



CLARK BROS. CO., INC. . . OLEAN, NEW YORK, U. S. A.

Export Office: 30 Rockefeller Plaza, New York. Domestic Sales Offices and Warehouses: Tulsa, Okla.; Houston, Texas; Chicago, Ill.; Boston, Mass. (131 Clarendon St.) West Coast Offices: Smith-Booth-Usher Co., Los Angeles, Cal. Foreign Offices: 72 Turnmill St., E. C. 1, London; 4 Str. General Poetas, Bucharest, Roumania.

CLARK



NATURAL GAS

fuel for the fires of Texas industry

The industrialization of the Texas Gulf Coast has been materially assisted by the availability of unlimited supplies of natural gas. Expanding and decentralizing industries have been quick to recognize the advantages of this Coast Country resource: the elimination of expensive handling machinery and storage space; ease of delivery and control; cleanliness; economies in furnace maintenance costs.

As a consequence, natural gas from our system of pipelines is furnishing the heat energy for a wide variety of established industries.

Combined with other resources, with markets at home and abroad, with exceptional rail, highway and water transportation facilities, natural gas gives these industries indubitable advantages over less fortunately situated competitors.

HOUSTON PIPE LINE CO.

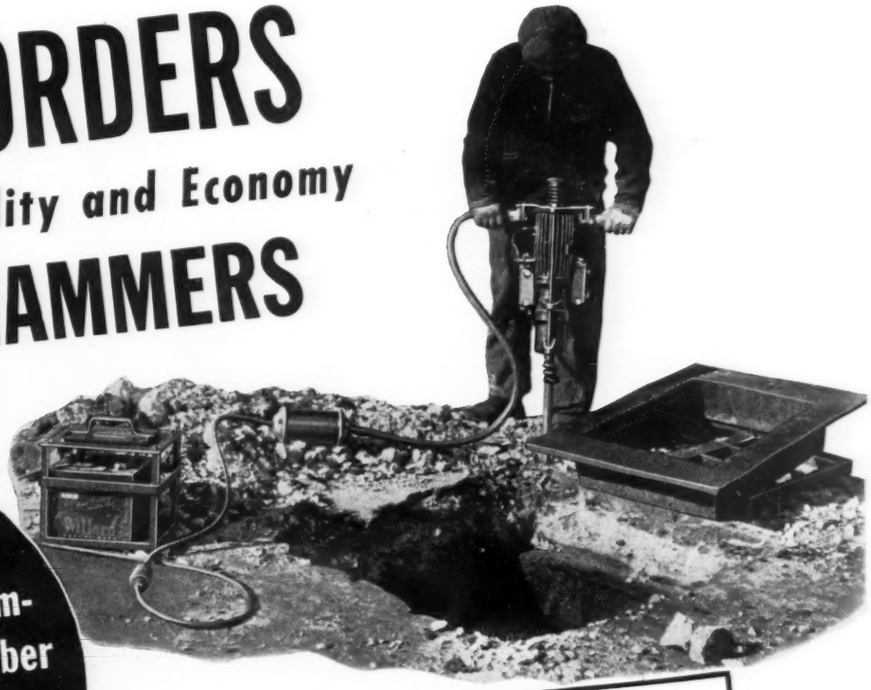
Subsidiary of Houston Oil Company of Texas

GEO. A. HILL, JR., President

Wholesalers of Natural GAS

REPEAT ORDERS

Prove the Reliability and Economy of BARCO HAMMERS



IN 1936
a leading gas utility company, operating a number of outlying districts, purchased its first BARCO Hammer

SINCE THAT TIME, THIS IS THE STORY OF BARCO INSTALLATIONS BY THIS COMPANY

- 1936 . . . . DISTRICT "A"
- 1937 . . . . DISTRICT "B"
- 1938 . . . . DISTRICT "C"
- 1939 . . . . DISTRICT "D"
- 1940 . . . . DISTRICT "E", DISTRICT "F", DISTRICT "G", DISTRICT "H"

Take a Tip From This Enthusiastic User—Start Your BARCO Program This Season

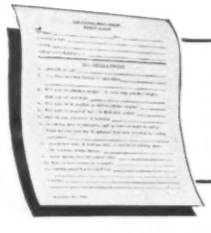
BARCO MANUFACTURING COMPANY • 1829 Winnemac Avenue, Chicago, Ill.

BARCO *Portable* GASOLINE HAMMER

Hand applied or machine applied —NO-OX-ID Combinations give

FOUR-WAY PROTECTION

No matter what method of application you prefer—hot or cold, hand or machine —there is a NO-OX-ID combination to suit your individual conditions. No other manufacturer offers such a wide variety of coatings and wrappers, giving you full protection with any application method.



Write for questionnaire to get recommended NO-OX-ID specifications.

NO-OX-ID Coatings and NO-OX-IDized Wrappers are designed specifically for the protection of underground pipe lines. NO-OX-ID coatings contain chemical inhibitors which render passive any pits or corrosion that may be present when the coating is applied. The wrappers are reinforced to resist soil action and thoroughly impregnated with NO-OX-ID to repel moisture. That's why they give lasting pipe line protection.

DEARBORN
CHEMICAL COMPANY
Dept. B, 310 S. Michigan Ave., Chicago

1 RESIST SOIL ACTION

2 PREVENT MOISTURE PENETRATION

3 INSULATE AGAINST ELECTRICAL EFFECTS

4 STOP UNDERFILM PITTING

We'll gladly send you an illustrated catalog describing the many new and outstanding advantages of this new line of Crane Valves for high pressure services. Write today—use the coupon.

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1940 OUR 85th YEAR

CRANE CO., GENERAL OFFICES
836 S. MICHIGAN AVE., CHICAGO
VALVES • FITTINGS • PIPE
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CRANE CO.,
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Without obligation, please send me a catalog on the new line of Crane Small Steel Valves. G-5-40

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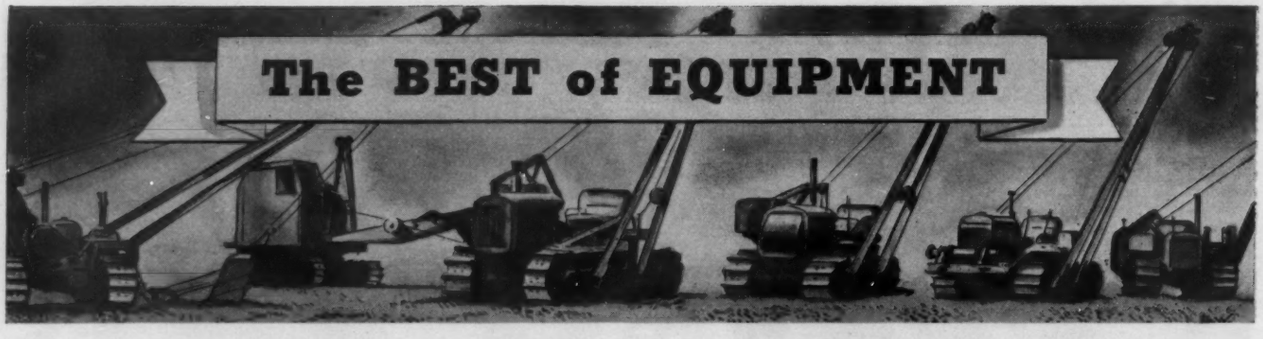
NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS



In

Pipe Line Contracting

EXPERIENCE *and* EQUIPMENT

Are Essential

●

Our Organization Has Had Twenty-two Years Experience in All Sections of the Country

Cave-ins Are Frequent and Need Special Handling

Weights of Sand Bags Being Used on Panhandle-Eastern Line to Keep Pipe Straight

Soft Dirt Is a Test of Men and Equipment

T. R. JONES

Formerly Oklahoma Contracting Corporation

MAGNOLIA BUILDING . . DALLAS

PROOF of LOWER COSTS with BUTANE-AIR

ACTUAL RECORD OF GAS PRODUCTION COSTS IN WELL-MANAGED PROPERTY BEFORE AND AFTER CONVERSION TO BUTANE-AIR

		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
GENERATION DATA													
24 HOUR RATED OUTPUT	MCF.	150	150	150	150	150-288	288	288	288	288	288	288	288
OUTPUT	MCF.	1,560.2	1,575.6	1,422.2	1,486.1	1,682	1,705	1,494	1,800	1,819	1,896	2,014	1,908
OIL USED	GALS.	5,979	6,260	5,301	5,779	4,185	410						
OIL USED	GALS./MCF.	3.83	3.97	3.73	3.89	3.59	4.23						
GENERATOR COAL USED	LBS.	87,474	90,426	77,691	79,867	62,667	5,437						
GENERATOR COAL USED	LBS./MCF.	56.1	57.4	54.6	53.7	53.7	56.1						
BOILER COAL USED	LBS.	53,080	54,820	43,235	49,745	38,920	4,520						
BOILER COAL USED	LBS./MCF.	34.0	34.8	30.4	33.5	33.4	46.6						
WATER USED	GALS.	189,100	211,400	189,800	199,400	196,800	215,500	133,700	9,612	9,327	10,297	11,262	9,928
WATER USED	GALS./MCF.	121	134	133	134	169	126	89	5.34	5.4	5.43	5.59	5.5
BUTANE USED	GALS.	4	4	4	4	4	4	7,846					
BUTANE USED	GALS./MCF.	3	3	3	3	3	5.52	5.25					
TIME OF RUN	MINUTES	610	610	589	590	600	584	570	570	570	570	570	570
TIME OF BLOW	MINUTES	561	566	560	554	550	562	570	570	570	570	570	570
MAXIMUM B.T.U.VALUE		578	582	571	572	573	569	570	570	570	570	570	570
MINIMUM B.T.U.VALUE													
AVERAGE B.T.U.VALUE													
COSTS													
TOTAL FUEL, OIL & BUTANE	$	681.57	742.25	572.45	633.47	624.21	582.22	440.18	513.28	484.07	504.55	686.98	391.16
NO.OF EMPLOYEES,OPERATING		3	3	3	3	5	2	0.5	0.5	0.5	0.5	0.5	0.5
TOTAL LABOR COST	$	352.46	384.30	350.32	350.59	563.35	314.23	37.77	39.89	62.08	64.76	64.66	116.50
MAINTENANCE MATERIAL	$	7.62	15.77	114.89	5.00	4.91	1.28	2.15					46.69
MISCELLANEOUS	$	48.58	70.18	39.51	63.04	72.46	46.96	38.82	35.82	45.00	16.45	45.32	29.73
TOTAL COST	$	1,090.23	1,212.50	1,077.17	1,052.10	1,264.93	944.69	518.92	588.99	591.15	585.76	796.96	584.08
PRODUCTION COST PER MCF. GENERATED													
GENERATOR COAL	CENTS/MCF.	16.48	18.79	14.18	15.74	15.73	33.11						
BOILER COAL	" "	6.32	6.46	5.40	5.95	6.69	0.16						
OIL	" "	19.01	19.71	18.52	18.78	17.32	48.76	1.47	28.52	26.62	26.61	34.11	20.50
WATER	" "	1.89	2.15	2.15	2.16	2.71	2.02	27.99	28.52	26.62	26.61	34.11	20.50
BUTANE	" "					25.02	29.11	29.46	28.52	3.28	3.11	1.96	2.15
TOTAL FUEL COST	" "	43.68	47.11	40.25	42.63	37.11	34.15	2.36	1.90	0.14	0.30	1.25	3.95
OPERATING LABOR	" "	22.43	24.23	24.16	23.42	33.34	13.34	0.17	0.32	3.41	3.42	3.21	6.11
MAINTENANCE LABOR	" "	0.16	0.16	0.48	0.17	0.15	5.09	2.53	2.22				2.45
TOTAL LABOR COST	" "	22.59	24.39	24.63	23.59	33.49	18.43	0.14			0.87	2.25	1.56
MAINTENANCE MATERIAL	" "	0.49	1.00	8.08	0.34	0.29	0.75	2.60	1.99	2.47			
MISCELLANEOUS	" "	3.11	4.45	2.78	4.24	4.31	2.75						
TOTAL PRODUCTION COST	" "	69.88	76.95	75.74	70.80	75.20	55.41	34.73	32.72	32.50	30.89	39.57	30.61

REMARKS: BUTANE PLANT PUT INTO OPERATION MAY 9. OUTPUT: BUTANE 515 MCF. WATER GAS 1167 MCF.
JUNE OUTPUT: BUTANE 1608 MCF. WATER GAS 97 MCF.

41% SAVING

Average production costs for last six months of 1939 were 41% less than for the first four months under water gas operation. Think what a difference in *net profit!*

Others are making greater profits with Butane-air and Propane-air. Why not investigate for YOUR company? Your inquiry does not obligate you.

Philgas
DEPARTMENT
PHILLIPS PETROLEUM COMPANY
GENERAL MOTORS BUILDING, DETROIT, MICHIGAN

NEW YORK
PHILADELPHIA
CHICAGO
BARTLESVILLE, OKLA.
MILWAUKEE
ST. LOUIS
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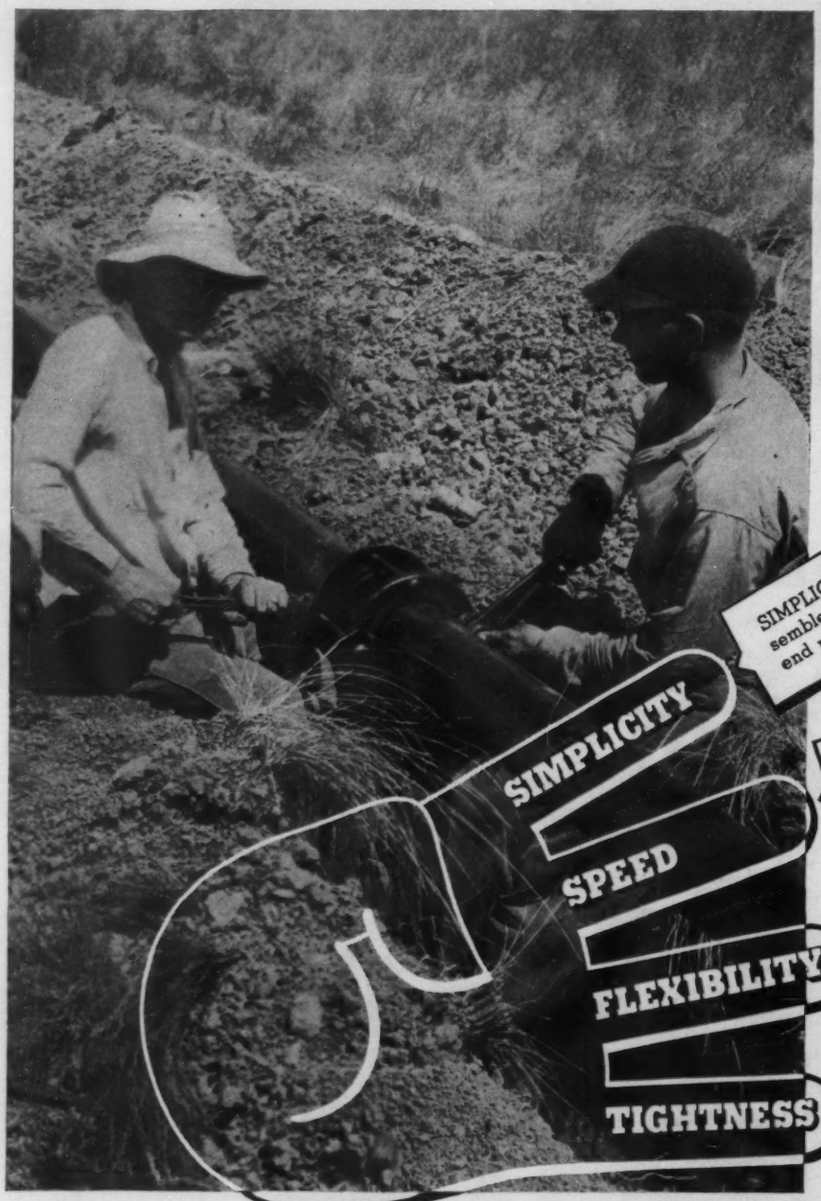
THE NATION'S LARGEST MARKETER OF LIQUEFIED PETROLEUM GASES

LOOK FOR ALL FOUR

before you decide



SIMPLICITY—unskilled labor assembles standard parts on plain-end pipe, using only a wrench.

SPEED—typical examples: 5 minutes for 8"; 8 minutes for 14"; 12 minutes for 20" (two workmen).

FLEXIBILITY—expansion and other pipe movements absorbed; curves with straight pipe.

TIGHTNESS—The *only* flexible joint with a 50-year, *proved* record of permanent tightness.

The winning foursome of Dresser advantages will do for you what they did for the builder of this 5½" OD, 105-mile pipe-line in Texas . . . expedite the job, lower the cost, "up" the satisfaction. • Nothing succeeds like Dressers' Simplicity, Speed, Flexibility, Tightness. *Only Dressers Give You* "ALL FOUR"!

DRESSER

PIPE COUPLINGS

DRESSER MFG. CO., BRADFORD, PA. Offices at New York, Chicago, Houston, and San Francisco. *In Canada:* Dresser Mfg. Co., Ltd., 60 Front St., W., Toronto, Ont.

FITTINGS?—We make a complete line of Long, Cast, Reducing, and Insulating Couplings; also steel and malleable ells, tees, crosses, etc. Write for our General Catalog Number 36.

This low-cost method Reduced Total Unaccounted-for Gas Loss 52.5%

Report shows "CARBOSEAL" anti-leak is effective remedy for leakage in Dry Bell-and-Spigot Joints

A COMPANY operating several properties completed "Carboseal" anti-leak treatment of one entire system at a total cost of $4,500. The system consisted of 82,310 ft. of steel main and 77,378 ft. of cast iron main. Tests extending over three months subsequent to the treatment showed a reduction in unaccounted-for gas loss amounting to 2,782,800 cu. ft. This represented a saving of 52.5 per cent compared with the entire system's loss for the corresponding three months of the previous year. These results were better than expected because the "Carboseal" anti-leak treatment corrected joint leakage in the cast iron main only, and the actual cast iron mileage was only 47.5 per cent of the total.

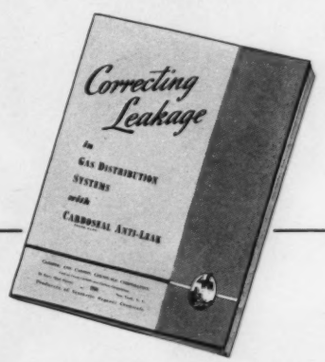
These results are typical of the experiences of more than 250 "Carboseal" anti-leak users throughout the country.

How "Carboseal" Anti-Leak Works

"Carboseal" anti-leak, a scientifically developed liquid, is introduced into the mains at high points and flows over the joints by gravity to the drips where the surplus is recovered for re-use. It can also be sprayed into the mains by means of a hose. Both of these methods are used without interrupting gas service, and without making expensive joint excavations.

"Carboseal" anti-leak cuts tar and gum deposits in the joints and swells dried-out jute packing to its fullest extent, so that the packing fills the voids. Its application also saturates dust and rust lying in the bottom of the main, holding it in place and preventing it from being carried by the gas into customer appliances. Joints treated with "Carboseal" anti-leak keep gas inside the mains and remain tight indefinitely.

Get A Copy of This New Book!



It will pay you to send for a copy of this book which incorporates in compact form all the essential facts about "Carboseal" anti-leak, the methods of application, comparative costs, and results obtained. Possibly this inexpensive and economical method of correcting joint leakage can be used to advantage in your system.

A request on your company letterhead will bring you a copy, without obligation.

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

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30 East 42nd Street, New York, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

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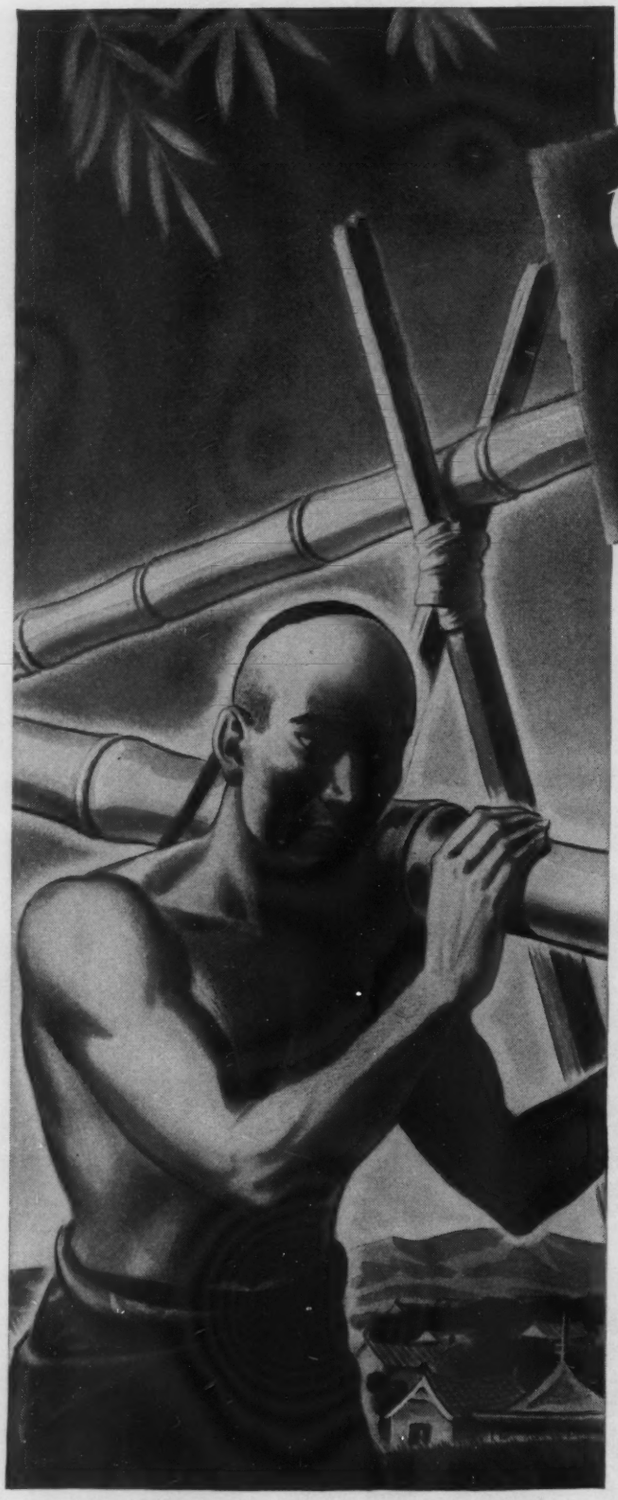


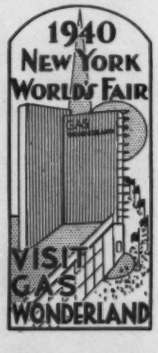
PRIMITIVE PIPE LINES OF OLD PEKIN

Age-old records show that Pekin (now Peiping) utilized Natural Gas more than 500 years before our country was discovered. Escaping from the ground nearby, it was transported through fragile bamboo pipes for evaporating salt water to produce salt and, as well, for illumination in that ancient seat of Chinese culture.

It is a far cry from this primitive practice to the modern method of distributing Natural Gas—an engineering feat never achieved by the China of antiquity, although she deserves credit for pointing the way.

As a result of her discovery, Natural Gas is now delivered to mains through giant metal pipe lines, overland and underground, many drawing their supply from distant fields.

Used abundantly and economically for numberless residential, commercial and industrial purposes, Natural Gas has attained rightful recognition as one of the greatest contributions of convenience to our present day civilization.



COLUMBIA SYSTEM

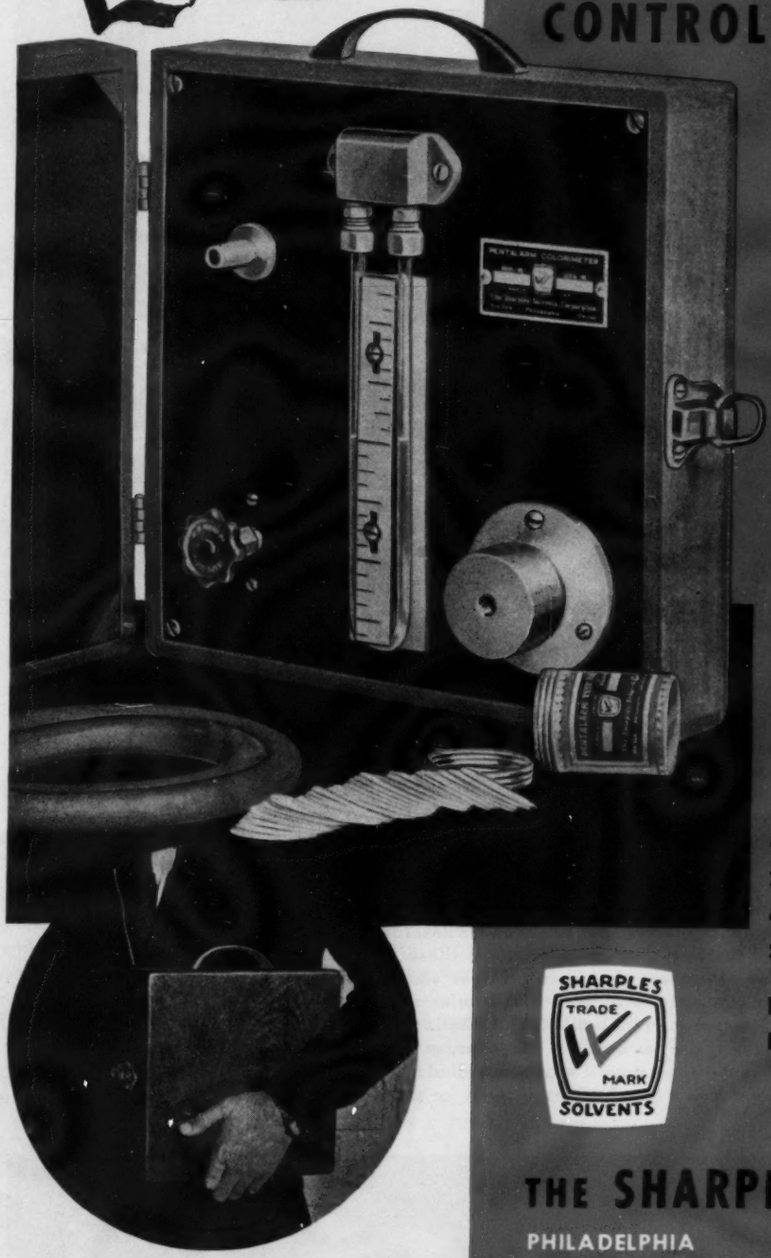
COLUMBIA GAS & ELECTRIC

CORPORATION

THE *New*

PENTALARM COLORIMETER

FOR VISUAL AND POSITIVE CONTROL OF ODORIZATION



The Pentalarm Colorimeter . . . a compact, self-contained, portable unit consisting of flow indicator, flow controller and "camera" . . . accurately measures Pentalarm concentration in pipelines. It is a ruggedly built instrument, easy to carry and ready for instant use. Standard Pentalarm Test Papers, placed in the "camera" and exposed to the gas stream, register a definite color when subjected to a strong light. These test papers are PERMANENT VISUAL RECORDS of odorization . . . a positive protection against uncertainty and fluctuating concentrations of odorant.

Pentalarm your Pipelines! . . . and use the new Pentalarm Colorimeter to assure accuracy and afford permanent proof of odorization!

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ILLUSTRATED BOOKLET WITH FULL PARTICULARS MAILED ON REQUEST

SHARPLES TRADE MARK SOLVENTS

THE SHARPLES SOLVENTS CORP.

PHILADELPHIA CHICAGO NEW YORK

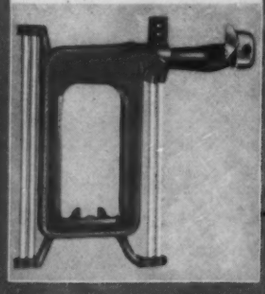
A *New* DEVELOPMENT IN ODORIZATION CONTROL

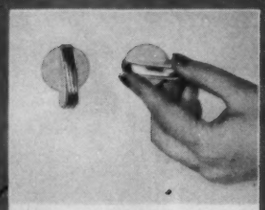
UNIVERSAL *Elevated Broiler* GAS RANGES

present

A NEW AND HIGHER STANDARD OF CONTROLLED BROILING PERFORMANCE!

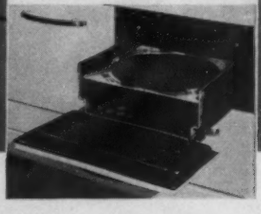
PRECISION BROILER BURNER equipped with Four Ceramic Radiant Tubes—gives new speed plus better distribution of heat over entire area of broiler grid.





SPECIAL BROILER GAS VALVE —gives a set low controlled heat for low temperature broiling and toasting.

IN-A-DRAWER BROILER WITH SAVORY SMOKE-PROOF BROILER GRID—no broiling hazards—eliminates smoke and acrid odors.



cp

Universal presents a complete line of CP gas ranges, including three distinct series of elevated broiler gas ranges.

★ Broiling is assuming an ever-increasing importance in the field of food preparation. Particularly in broiling, gas offers unquestioned advantages over all types of competitive fuels. With the new and advanced broiling devices incorporated in the Universal Gas Range, broiling today is smoke-free—acrid odors are cut to the minimum . . . . The Universal Gas Range, with elevated In-A-Drawer Broiler, offers a new advance to the art and method of broiling. The Precision Broiler Burner with Four Ceramic Radiant Tubes gives new broiling speed plus a more even distribution of heat over the entire area of the broiler grid. The Savory Smoke-Proof Broiler Grid, with Chrome Broiler Pan definitely eliminates smoke in the broiling operation, and the In-A-Drawer Broiler not only gives smooth, quiet operation, but removes all hazards from broiling—it keeps the face and hands out of the heat zone. In addition to these advantages, the Universal elevated broiler gas range now offers a new and higher standard of controlled broiling performance in that it is equipped with a special broiler gas valve which gives a set low, controlled heat for low temperature broiling and toasting. In brief, Universal has enhanced the natural advantages of gas for broiling purposes, giving the guarantee of successful broiling results and at the same time it eliminates all of the objections formerly associated with broiling. Universal broiling is front-page news for the gas utility as well as the consumer.

Universal Gas Ranges

MANUFACTURED BY CRIBBEN & SEXTON CO. • 700 N. SACRAMENTO BLVD. • CHICAGO, ILL.

GAS
MAY, 1940

GUEST Editorial

TODAY'S OPPORTUNITY IS TOMORROW'S PROGRESS

By ELMER F. SCHMIDT

Chairman, Natural Gas Section
American Gas Association

WE serve a product that is never seen. We are conscious only of the results of this concentrated energy. The tremendous facilities required to guarantee the perfect service which our customers expect and to which they are accustomed are far removed from the daily comprehension of the public. The search for this unseen energy, the drilling and the capture of the elusive product, its transportation and preparation for ultimate utilization are all quite unknown to our customers. Only in rare cases when the service fails are they remotely aware that the gas which leaps so instantly from their burner tip is anything but an automatic device of nature.

If a means could be developed to give the millions of gas consumers some vision of the romance and some comprehension of the labor and equipment back of their gas service, favorable public sentiment would most surely follow. We want the good will of our customers and the public generally, but so busy are we with the operating details which make gas service what it is today that we too often fail to cultivate this good will except through the unexcelled service and fair treatment which we render.

No industry can advance in this progressive age without a far-reaching vision and constructive program looking well into the future. The most profitable procedure for any business man today is to stop taxing his memory and concentrate all his mental and physical efforts on the immediate future and the problems that lie just beyond. We should decide that we've got to succeed in spite of the tough going and then buckle down with everything we've got, to place our industry in the front ranks where it belongs. Progress has been made but we cannot stop now. We need no new formula for success, for most of the old rules still apply even in these changing times. We do need, however, an intelligent comprehension of our problems so we can integrate every phase of this business and deliver all of our power where it is needed.

What better way could be found to keep abreast of new ideas and discoveries than attendance at the forthcoming 35th Annual Natural Gas Convention to be held at Houston, Texas, May 6-10. This convention will be held concurrently with the 17th Annual Distribution Conference and the joining of these two groups should stimulate greater interest in each meeting. The progress of the gas industry in all of its branches will be discussed by speakers of outstanding ability and national reputation. Subjects of vast importance to every gas company official and employe will be fully presented at this annual session. The inspiration which will be engendered by attendance at this convention I am confident will carry all of us on to greater achievement.

In spite of unusual restrictions, extraneous problems, excessive regulation and exorbitant taxes, our industry is still moving forward at a remarkable tempo toward a future limited only by ourselves. The opportunities for further development, improvement, and expansion are as great as ever they were. Our horizons have not drawn closer — they are still far enough away to be part of the future. The threshold of a progressive career has just been touched and a new era of pioneering is before us. Shall we miss the opportunity that is ours to help bring our country out of the fears that have so badly handicapped progress during the past few years? The leaders of the past, by seizing the opportunities of their day, have handed on to us an industry of great service; and only by doing the same can the men of today accomplish similar results.

Your meter dollar buys more
because of continuous modernization
AMERICAN METER CO
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C-1104

THERMALLY *Thinking*

Too Many Meetings

The joint meeting in Houston this month of the Natural Gas Section and the Distribution Conference of the American Gas Association is to be commended, in that it reduces by one at least the inordinate number of annual, semi-annual and other periodic gatherings that are being held in the industry. This is in conformity with the expressed opinion of President Walter Beckjord, and the private conviction, no doubt, of many other utility executives who are beginning to cast an inquring eye over the expense accounts and the time loss involved in sending company representatives to the innumerable conclaves that are called.

As great as the drain of these periodic migrations is on the utilities, it is even greater on the manufacturers of gas appliances, supplies, materials and equipment who are expected, without consultation, to be represented at practically every session, regardless of how small or insignificant it may prove to be. The manufacturer is in an extremely delicate position, for he is called on not only to send representatives, but to do it with good grace lest his apparent reluctance to participate should undo the supposed good will that their presence is designed to create.

The rash of conferences, conventions, splinter groups and rump sessions should not be allowed to spread further. The time has come for a sane re-evaluation of the industry's whole convention technique. To this end we invite and urge communications from both utilities and manufacturers who would like to see the situation altered to achieve any economy consistent with the general welfare of the entire industry.

Kitchen Cuties

We've just adjusted our bifocals and looked over the A.G.A. 1940 National Advertising Program that is going to appear in 18,000,000 copies of national magazines between now and September, and we have come to the sad conclusion that old folks don't eat. We learned long ago from the national advertising that they don't clean their teeth, and they don't buy automobiles, and they don't care if they "offend" — but we always thought that somehow they were still interested in food, its preparation and its ingurgitation.

Now we know better, and the kitchen too has been turned over to chorus men and toothie cuties who look as if they would have to be led into a kitchen blindfolded and photographed in the split second that preceded their mad flight to the poudre room.

Maybe crochety old customers like ourselves will get attention when the fall heating campaign breaks, and we will be shown tottering across the living room floor to shove the thermostat up a couple of degrees higher. In the meantime, since no one wants our money we will worry along with the old stove, hoping that the children, God bless them, won't have all of the new models snapped up before we are invited into the showroom.

The Real Point

Organized labor, as represented by the executive council of the American Federation of Labor, gets the point. What point? Why, that profits make jobs! In a recent report from the executive committee we find the following:

> "At this time there are not enough jobs in private industry to go around. This is largely due, in our opinion, to the fact that lack of confidence has stunted business growth and expansion. . . . We urge that all government actions that tend unnecessarily to discourage business expansion cease and that a positive effort be made to encourage greater industrial activity. We have learned the lesson that when opportunities for profit diminish, opportunities for jobs likewise disappear."

Now that organized labor has seen the point, the pity is that our new dealers cannot see it. They are so busy looking around corners that they are cockeyed. They see a profit, without any regard to the dangers, worries and responsibilities incidental to the making of it, as something either gouged from the public or from the sweat of the employes. Thus they cannot see wood for trees. The real difference between good and bad times is not the margin of profit that this or that business makes, but in the number of companies that make profits and the number that take losses. In 1929, 269,000 companies made profits, and 187,000 lost money. In 1932, 83,000 made money, and 369,000 lost it. In 1936, 203,000 operated profitably, and 276,000 were in the red. A company losing money is certainly no job-creator, and more often than not is obliged to reduce its pay roll.

Another unfortunate trait of the new dealer is his apparent inability to appreciate the significance of future profits. With confidence in the future, industries expand their plants, extend their services and install new equipment — all job-building operations. But when government, like a terrier, is snapping and snarling at a business man's heels every step he takes, nobody can look ahead. He is kept too darned busy protecting his rear.

Convenience Outlet

It is the responsibility of intelligent management to make any utility service convenient and therefore easy to use. In fact, it is good business. Extension telephones are an example. Convenience outlets liberally scattered throughout a home are very much the story behind the growing average domestic electric consumption we hear so much about.

We have often wondered why the gas industry in America has been so tardy in this respect. Gas convenience outlets are not new. They have used them for years in Europe. The Englishman plugs in his gas radiant heater in the fall and plugs it out in the spring. The laundress has a gas plug near her ironing board, and it encourages her to continue using her gas iron.

Conceding many of the small possible incidental uses for gas around the home are electrified, the use for a gas convenience outlet still remains if and where we prize the direct radiant heating load.

The English type we saw a few years ago was simplicity itself, with a positive spring connection adequately protecting the user. It was simpler to plug in than an electric outlet.

We believe there is a real need for such an outlet with us, and we welcome a recent announcement of a gas inlet control valve for wall installation, little larger than its electric prototype and proposed for use with gas ranges, refrigerators, and other domestic appliances.

Advertising

Advertising is the art of attracting favorable attention to your service or product. No more, no less. Its ramifications lie in the appeals used, methods of presentation, and media employed. Industrially, it is basic, and the gas industry has signally recognized this fact by its augmented national advertising campaign, and industrial displays originating at A.G.A. headquarters. As an industry, we are on our promotional toes. How about our individual advertising activities? Few companies go beyond their own bailiwick, except where circulation spillage makes it incidental. Yet, the opportunity is ever-present.

Recently picking up *Business Week,* our third-favorite business publication (*G A S* and *Butane-Propane News* are our first and second choices, of course), we read with great relish a page advertisement signed by the United Gas Pipe Line Co. The advertisement told of the industrial advantages of the South, or the territory served by the company. It was a good, convincing advertisement. To a gas man, it was especially interesting, because one of the major selling points advanced to tempt industry to locate in the South is the availibility of natural gas as a service for industrial power. "Natural gas for steam generation" reads the advertisement, "is the customary fuel — economical, efficient, and dependable."

We like this advertisement.

Keeping Gas Heat In the Home

Gas is used to put heat into homes. Insulation is used to keep that heat there. Gas never loses out to an inferior fuel because it is less flexible, because it is dirty and disagreeable to handle, because it is unsatisfactory in any way as a source of heat. Gas loses out, when it does lose out, on a house heating job because it costs more than other fuels available in any particular locality.

It isn't the heat that is actually used for the comfort of the occupants of a house that is expensive; it is the heat that is used to warm up all outdoors because of losses through doors, windows, walls, and roof. Insulation service can stop a major part of that loss. Any saving in heat loss means a saving in the fuel bill.

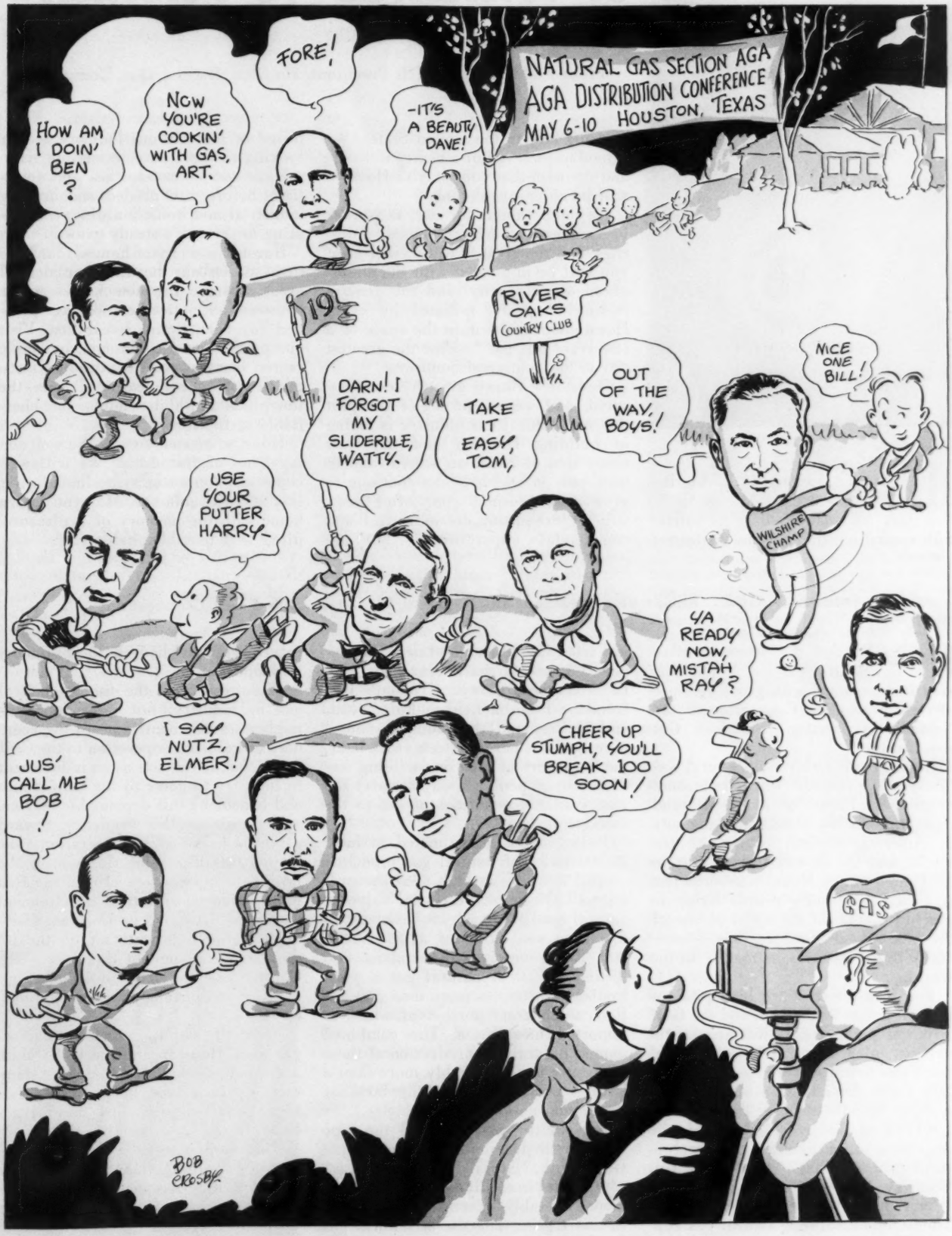
This saving in many instances is enough to not only pay for the insulation, but also to bring the fuel bill within the range of the home owner's heating budget. The Oklahoma Natural Gas Co. made a study in Oklahoma City which showed a fuel saving of 43% in an insulated house, compared to the same house prior to insulation.

An Oklahoma City mineral wool dealer uses these figures to go after insulation business. His argument: It will cost $150 to insulate a small house that has an average heating bill of $60 per year. The F.H.A. payment on that part of the loan would be $12. On the basis of 40% fuel saving, the gas bill would be $24 per year less.

Everybody benefits. The owner has the advantage of a perfect fuel at a price he can afford. The insulation dealer has sold a job on which he has made a profit. And the gas company has overcome the only sales argument that competing fuels have successfully used — that gas heat costs too much.

Every gas company interested in selling house heating owes it to itself to explore thoroughly the advantages of cooperating with the insulation contractors that are working to make economical house heating a reality.

It's ALL ABOARD for HOUSTON!



"I say, Mr. Espy, I hear they're limiting the Convention's Golf Tournament to vice presidents this year."

A Welcome To Houston

From FRANK C. SMITH, President, Houston Natural Gas Company

HOUSTON is honored in having the Natural Gas Section of the American Gas Association hold its thirty-fifth annual meeting here in the fastest growing city in the United States. We extend to each visitor a hearty welcome and the wish that your stay in Houston will be an enjoyable one.

As you go about our city, as you see its homes, its business houses, industries, and the great Ship Channel area, you will be impressed with the atmosphere of prosperity, and the general feeling of pride, radiated by every Houstonian, that within the space of a few years this has become the greatest city in the South and Southwest.

Houston's future growth seems assured, and we are proud of the part that our natural gas industry is taking in building Houston and the Gulf Coast area of Texas on a firm foundation, one on which it can continue to grow and prosper, year after year, without exhausting its industrial and commercial opportunities. We are proud of the way our industry is ever looking to the future, extending natural gas service as soon as, and sometimes before, it is needed, encouraging industrial and home building, contributing to the city's steady growth.

Houston is a city of homes, too. Take time to see our beautiful residential areas, observe the new homes under construction, notice how we have planned for beauty and liveability. Visit our parks, our Art Museum, our civic center, our two great educational institutions of higher learning; note the fine grade and high schools; our charitable institutions.

Houston extends to you the welcoming hand of friendship. We will welcome any opportunity to make your stay an enjoyable one. May you return home with the memory of a pleasure-filled visit to a hospitable city.

From A. B. GROESBECK, Vice President and General Manager, United Gas Corporation

HOUSTON and the representatives of our natural gas industry in this area look forward with great pleasure to the forthcoming Convention of the Natural Gas Section, American Gas Association.

Houston will receive the Natural Gas Convention visitors with traditional hospitality. Proud of its record and reputation as the fastest growing city in America, the oil capital of the world, and the second largest port in the United States, Houston nevertheless is a city of friendly people living in gracious homes in the midst of one of the most interesting regions — especially to the natural gas man — in the world.

For Houston is a world capital of natural gas as well as oil, and the Gulf South is an empire. In this area, natural gas on a large scale commercial basis was first discovered — when Captain Lucas brought in a high-pressure well at Spindletop near Beaumont in 1901. This discovery signalled the beginning of a natural gas development program that is still under full headway.

Not only is this region the source of almost immeasurable natural gas supplies, but it is also the birthplace of the natural gas transmission pipe line. The first pipe line was a 40-mile project from Caddo gas field near Shreveport, La., to Marshall, Texas, in 1906. In 1910 there followed a 130-mile line from the Petrolia field to Fort Worth and Dallas, and the "long distance" pipe line was here. Sixteen years later, the feasibility of pipe line welding was discovered, opening a way to carry the vast available quantities of gas to the markets.

Today, Texas is estimated to have 28,000 miles of natural gas pipe line — 15.5% of the nation's total. According to 1937 figures, the total value of natural gas produced in Texas up to that time was estimated at $132,000,000. Texas now produces about 800 billion cu. ft. of natural gas a year. Louisiana produces more than 300 billion, a moderate portion of which is imported into Texas. The combined annual natural gas production of these two states is considerably more than a trillion cu. ft., approaching 50% of the annual national total.

Beyond the gas well and the pipe line are the distribution systems of the Gulf South. Natural gas is now the accepted fuel in millions of homes, commercial establishments and industries in this region. The use of natural gas for heating is almost universal. Some 90% of the householders in this area use natural gas for cooking, and other natural gas-fired household appliances in proportion.

With respect to the use of natural gas in industry, not only does this mighty servant contribute to the economy of industrial operation in the Gulf South, but also it acts as an inducement to industry to come to the Gulf South and benefit by this dependable service.

Recognizing this tendency toward southward industrial migration, the United Gas Pipe Line Co., one of the large transmission concerns of the area long active in industrial development work, has expanded its program to include national advertising on the industrial advantages of this area — the "Gulf South" advertising which is appearing in various national publications.

From the standpoint of the natural gas man, Houston and the Gulf South are a new kind of Eldorado — a famous city in a land made fabulous — to no small degree — by natural gas itself.

Therefore, it seems especially fitting that the Natural Gas Section of the American Gas Association should convene here, and all of us in Houston who are interested in the progress of this great and growing industry extend a hearty welcome to the Convention visitors.

Program Highlights

And Houston Leaders Who Will Greet the Delegates

GAS industry executives, engineers, salesmen—3000 in number—will gather in Houston this month as delegates to the 35th Annual Natural Gas Convention and 17th Annual Distribution Conference, which will meet jointly for the first time at the Rice Hotel, Houston, Texas, from May 6 to 10. The following resume of the program has been outlined by E. Holley Poe, secretary of the American Gas Association's Natural Gas Section.

Elmer F. Schmidt, Natural Gas Section chairman and vice president of the Lone Star Gas Co., Dallas, will preside over the opening general session on May 7. The second general session on Wednesday morning will be conducted by H. D. Hancock, chairman of the General Program Committee and vice chairman of the Natural Gas Section.

The chairman's address will open the first meeting and is followed by "The Natural Gas Industry — 100 Years of Progress," to be presented by Walter C. Beckjord, president of the American Gas Association and executive vice president, Columbia Gas and Electric Corp., New York, N. Y. Other timely topics on the opening program are "The Company Program for the Sale of Summer Air Conditioning," by Charles R. Bellamy, chief engineer of the Gas Department, Columbia Gas and Electric Corp.; "Institutional Advertising and Publicity," by John H. Warden, general sales manager, Oklahoma Natural Gas Co., Tulsa, Okla., and "Federal Power Commission Procedure Under the Natural Gas Act," by Wm. A. Dougherty, counsel, Standard Oil Co. (New Jersey), New York, N. Y. The latter subject will be discussed from the point of view of recent decisions.

A. B. GROESBECK

Major Alexander Forward, managing director of the A.G.A., opens the second general session of the Natural Gas Convention, which will deal largely with the subject of research. Howell C. Cooper of the Hope Natural Gas Co. and chairman of the Main Technical and Research Committee of the Natural Gas Section, who has long been identified with this branch of work, will present his address, "Contribution to the Natural Gas Industry by the Studies of the Main Technical and Research Committee." Herbert W. Graham, director of Metallurgy and Research for the Jones & Laughlin Steel Corp., Pittsburgh, has chosen for his subject, "Contribution to the Natural Gas Industry by Research in the Steel Industry," and Frank C. Smith, chairman of the American Gas Association's Committee on Fundamental Research and president of the Houston Natural Gas Co., will speak on "Relationships of Fundamental and Applied Research Problems Confronting the Natural Gas Industry." The meeting closes with "Improvements in Industrial Processes Through Advancement in Heat Application," by Henry O. Loebell, vice president, Combustion Utilities Corp., New York, N. Y.

Luncheon conferences will play an important role at the 1940 Natural Gas Convention and Distribution Conference. Distribution committee luncheon meetings will be reported on by their chairmen at Wednesday sessions, May 8.

The Natural Gas Section luncheon on Monday, May 6, is expected to draw a record attendance. In the first place, H. C. Thuerk, chairman of the A.G.A. Community Development Committee and general manager of the Utility Management Corp., New York, N. Y., is discussing the work of his committee, his subject being, "Opportunities Presented to Gas Companies in the Community Development Program." The work of this committee in its endeavor to encourage a more active participation on the part of gas companies in the development of their communities, is being followed with great interest. Listed among the projects of the committee is that of collecting the experiences of utility companies who have taken an active part in community development activities.

Co-starring with Mr. Thuerk on this luncheon is the presentation of a Variety Show, a Home Service program prepared by the program chairman, Albertine Berry, on the suggestion of Mrs. Eliza M. Stephenson, chairman of A.G.A.'s Home Service Committee and home service director of the Jersey City Power and Light Co., Asbury Park, N. J.

The Home Service program promises to be a live wire performance, consisting of "good talks, songs and fun." Subjects are: "The Big Audience," Mary Alice Crosson, West Texas Gas Co., Lubbock, Texas; "Chil-

HOUSTONIAN HOSTS—Above: Two United Gas Corporation executives. (Left) Houston Division Manager K. L. Simons, and (right) Vice President J. V. Strange of the Operating Division. Center: Houston Pipe Line Co.'s General Manager C. Lee Wood and Sales Manager Robert L. Dabney; (at right) George D. Wilson, director of public relations for Houston Natural Gas Co. Below: Two Houston Natural Gas Co. sales executives. (Left) J. M. Robertson, industrial sales manager, and (right) W. S. Keenan, domestic sales manager.

dren's Matinee," Nell Read, San Antonio Public Service Co., San Antonio, Texas; "The Man in the Balcony," Evelyn Barton, United Gas Corp., Lake Charles, La.; "Home Service Must Have a Sense of Humor," Emma Wood, Louisiana Public Service Co., Lafayette, La.; "The Director Gives a Curtain Talk," by a well-known executive.

Luncheons Aplenty

Another luncheon meeting keyed to modern tempo features a second address on the subject of community development by R. C. Morrison, director of Holland's Southern Institute for Town Service, Dallas, Texas, whose subject is "Balanced Town Building." Mr. Morrison is an authority on this subject and has done outstanding work in town building in this country. With Mr. Morrison on this program is D. W. Harris, vice president, Arkansas Natural Gas Corp., Shreveport, La., who speaks with experience on the subject of "Industrial Gas — What It Means To Us."

Natural gas operating men will be well repaid for their visit to Houston in the complete programs on transmission and production. There will be three afternoon sessions of the Transmission Conference on May 6, 7, and 8. This program attacks many transmission problems in a constructive manner as well as pointing out new achievements in this branch of the industry.

Featured on the Production Conference on Monday morning, May 6, is a symposium on "The Underground Storage of Gas," to be presented by executives and geologists from various sections of the country, who will describe the experiences of their respective companies in gas storage. At the second session on Monday afternoon there will be featured a symposium on

R. M. Hutchison, chief engineer of Houston Natural Gas Co., talks over plans for the visiting delegates with Curtis H. Fisher, general superintendent, Texas Natural Gas Utilities, Gulf Cities Natural Gas Co., Tex-Mex Natural Gas Co.

"Drilling Beyond the First Mile — With Rotary Tools and With Standard Tools."

Space does not permit the full enumeration of all subjects and all programs. The Industrial Gas Sales Conference, however, is not the least of the important and interesting meetings, nor is the Conference on Accident Prevention and Employe Education, nor the Domestic Gas Sales Conference featuring the "Gas Information, Please" (by courtesy of Canada Dry Ginger Ale, Inc.). President Beckjord will be the interlocutor, while the board of experts will consist of Commercial Section Committee Chairmen George L. Scofield (Ranges); W. L. Hutcheson (Water Heating); J. G. Tooker (House Heating); B. T. Franck (Refrigeration); Eliza M. Stephenson (Home Service); and T. J. Strickler (National Advertising).

Returning to the Home Service program, mention must be made of the skit to be given on Tuesday afternoon, May 7. This promises to be fully up to the dramatic record that has been already established by those in home service work.

In addition to the luncheon conferences which have always proved a popular feature of the Distribution Conference, there will be three general sessions.

Distributors' Meetings

A few of the outstanding subjects of these programs are:

"Use of Pressure Regulators on Gas Appliances," H. L. Masser, vice president, Southern California Gas Co., Los Angeles, Calif.

"Tool Control," Lee Holtz, general superintendent of distribution, Southern California Gas Co., Los Angeles, Calif.

"Limits of Flexibility of Gas Appliances Operating on Natural Gas," R. M. Conner, director, American Gas Association Testing Laboratories, Cleveland, Ohio.

The final session on Thursday morning, May 9, includes the following:

"Determination of the Current Required for Cathodic Protection," Dr. Scott Ewing, research associate, National Bureau of Standards, Washington, D. C.

"Studies in Microbiological Anaerobic Corrosion," Raymond Hadley, Susquehanna Pipe Line Co., Philadelphia, Pa.

"Sulphur Removal From Natural Gas," W. R. Wood, Girdler Corp., Louisville, Ky.

"Electrolysis Mitigation for Protection of Underground Distribution Systems Within Cities," R. J. Kuhn, consulting engineer, New Orleans, La.

Visitors will have an opportunity to become acquainted with the great Gulf South and to explore the famous Lone Star State and go on into Mexico.

Among those who will greet the visiting delegates are the three executives of United Gas Corporation's Operating Division shown above: General Superintendent H. P. Carroll, Assistant Secretary and Treasurer L. V. Tracht, General Sales Manager Dean A. Strickland.

THE NATURAL GAS INDUSTRY —1939—

By PAUL RYAN

Chief Statistician, American Gas Association

PRELIMINARY estimates indicate that the total production of natural gas in 1939, including amounts used for the manufacture of carbon black and for field purposes, reached a total of two trillion, 200 billion cu. ft. Sales of natural gas for domestic uses rose from 353,000,000,000 cu. ft. in 1938 to 377,000,000,000 cu. ft. in 1939, an increase of nearly 7%. Sales for industrial and commercial purposes registered an even more pronounced upturn, rising from 860,000,000,000 cu. ft. in 1938 to 958,000,000,000 cu. ft. in 1939, representing a gain of more than 11%. Revenues of the industry aggregated some $450,000,000, or more than 8% above the preceding year.

At the end of 1939 natural gas was available to towns and cities with a population of approximately 34,000,000 people.

The automobile business has long been considered one of the most basic of the great industries of the United States, affording employment to many thousands and manufacturing a product which has become essential to the complex industrial civilization of this country.

Yet the average person would probably be surprised to learn that the investment in the natural gas industry is almost double the amount of capital employed in the production of automobiles. While some $1,369,631,000 has been invested in the automotive plants of this country, over $2,400,000,000 of capital is required to provide natural gas service to the 7,479,000 customers of this great industry.

Approximately 64,000 people are employed by the natural gas companies of this country at an annual payroll in excess of $103,488,000. An interesting sidelight on the contribution of the gas industry toward improved living conditions for the workers engaged in supplying this essential service is indicated by the fact that, whereas in the peak year 1929 the average employe in the natural gas industry worked 49 hours per week, by 1938 this had been reduced to 40 per week, and yet his average weekly earnings for the 40-hour week were 16% higher than in 1929.

An important factor in this accomplishment, and in the maintenance of the high standard of service to which natural gas customers have become accustomed, is the tremendous amount of capital that stands back of each worker in the natural gas industry. For example, in the automobile industry, approximately $2600 has been invested in plant and machinery for each worker employed. In the case of steel, this figure is about $7000, while the railroads have an investment of approximately $23,400 for each employe. Yet the average worker in the natural gas industry has behind him the tremendous investment of $38,000.

One of the outstanding developments in the natural gas industry during the past decade and a half has been the expansion into territories and markets formerly served with manufactured gas.

In 1938 there were some 84 former manufactured gas companies distributing straight natural gas of approximately 1000 B.t.u. to 1,991,911 customers who purchased 154,099,849 M c.f. of natural gas, or 1,540,998,490 therms, for which they paid $89,598,353, an average rate of 5.8c per therm.

In 1923 these same companies were distributing manufactured gas of about 530 B.t.u. to 1,412,662 customers who purchased 60,458,813 M c.f. of manufactured gas, or 320,431,700 therms, for which they paid $58,028,262, an average of 18.1c per therm.

SUMMARY OF GAS SERVICE AND GAS APPLIANCES

(Used in 117,651 New Homes Constructed During 1939)*

Gas	*Number of New Homes*	*Cooking*	*Per Cent*	*Water Heating*	*Per Cent*	*Refrigeration*	*Per Cent*	*House Heating*	*Per Cent*	*Gas for 4 Big Jobs*	*Per Cent*
Natural	76,860	70,676	92.0	72,637	94.5	8,070	10.5	67,494	87.8	6,778	8.8
Mixed	4,204	3,768	89.6	2,598	61.8	510	12.1	1,666	39.6	353	8.4
Manufactured	36,587	31,601	86.4	18,407	50.3	6,032	16.5	7,242	19.8	2,192	6.0
Total	117,651	106,045	90.1	93,642	79.6	14,612	12.4	76,402	64.9	9,323	7.9

*Meters represented by above figures: Natural Gas, 4,092,790; Mixed Gas, 1,018,650; Manufactured Gas, 4,164,414; Total Meters, 9,275,854.
Statistical Department, American Gas Association.

COMPARATIVE ESTIMATED DATA ON DOMESTIC APPLIANCES (1929-1939)

(Domestic Appliance Sales — Thousands of Units)

Type of Appliances	*1939*	*1938*	*1937*	*1936*	*1935*	*1934*	*1933*	*1932*	*1931*	*1930*	*1929*
Gas Ranges	1,330	1,024	1,420	1,464	1,109	844	711	628	984	1,375	1,600
Gas Refrigerators	241	185	265	200	160	120	80	100	85	65	50
Gas Fired Central House Heating Installations*	105	90	100	70	68	39	51	118	102	36	30
Gas Water Heaters	925	740	850	690	549	467	385	448	638	766	895
Electric Ranges	340	275	405	318	215	123	50	60	115	180	158
Electric Refrigerators	1,840	1,240	2,310	1,996	1,568	1,283	1,016	798	906	791	778
Electric Water Heaters	102	100	115	104	70	.....	.....	.....	.....	.....	.....
Oil Burners	242	202	219	225	157	110	89	86	104	126	131
Oil Range — Burners	88	193	321	243	207	132	180	224	148	76	.....
Oil Burner — Space Heaters	237	370	487	371	247	129	76	44	43	39	.....
Oil Burner — Water Heaters	30	37	27	21	12	9	.....	.....	.....	.....	.....
Coal Stokers	98	93	97	79	42	24	15	10	11	.....	.....

(Domestic Appliances in Use at End of Year — Thousands of Units)

Gas Ranges	16,491	16,135	15,943	15,484	15,149	14,821	14,462	14,463	14,975	15,127	14,801
Gas Refrigerators	1,500	1,310	1,125	860	660	500	380	300	200	115	50
Gas Fired Central House Heating Installations*	900	825	735	634	566	498	459	408	290	188	148
Gas Water Heaters					Not	Available					
Electric Ranges	2,510	2,275	2,119	1,735	1,449	1,256	1,148	1,100	1,095	1,020	875
Electric Refrigerators	13,701	12,101	11,400	9,200	7,000	6,020	4,900	4,300	3,499	2,625	.....
Electric Water Heaters	491	389	289	174	70	.....	.....	.....	.....	.....	.....
Oil Burners	1,905	1,689	1,544	1,356	1,155	1,014	920	843	761	665	548
Oil Range — Burners	1,600	1,535	1,377	1,120	926	760	628	449	224	.....	.....
Oil Burner — Space Heaters	1,900	1,684	1,351	913	579	332	203	127	83	.....	.....
Oil Burner — Water Heaters	140	117	82	55	34	22	.....	.....	.....	.....	.....
Coal Stokers	470	371	278	181	102	60	36	21	11	.....	.....

NOTE: *While no comparative data is available on gas space heaters, unit heaters, etc., the latest available data from U. S. Census of Manufacturers indicate 886,000 units were sold during 1937. It is estimated that at the end of 1939 there were approximately 1,600,000 dwellings heated by such gas appliances, giving a total of more than 2,500,000 homes in the United States heated by gas. Statistical Department, American Gas Association, February 16, 1940.

In addition there were, in 1938, 28 former manufactured gas companies serving mixed gas of approximately 840 B.t.u. to 1,771,841 customers who purchased 60,800,039 M c.f. of mixed gas, or 510,720,328 therms, for which they paid $66,489,987, an average rate of 13c per therm.

In 1923 this same group of companies sold manufactured gas of approximately 530 B.t.u. to 1,429,813 customers who purchased 63,459,320 M c.f. of manufactured gas, or 336,334,396 therms, for which they paid $59,803,023, an average rate of 17.8c per therm. In other words, the number of consumers actually using gas in 1938, had they paid the rates of 18.1c and 17.8c, respectively, in force in 1923, would have had to pay $124,260,500 more for the equivalent service in 1938 alone.

MILES OF MAIN IN USE BY THE NATURAL GAS INDUSTRY IN THE UNITED STATES (1933-1938)

	1938	*1937*	*1936*	*1935*	*1934*	*1933*
Transmission	83,100	81,600	80,500	79,600	78,800	78,200
Distribution	103,800	101,800	98,500	95,400	94,200	92,800
Total	186,900	183,400	179,000	175,000	173,000	171,000

Statistical Department, American Gas Association.

EMPLOYES AND PAYROLL OF THE NATURAL GAS INDUSTRY IN THE UNITED STATES (1929-1938)

Year	*Number of Employes*	*Annual Payroll*	*Average No. of Hours Worked Per Week*	*Average Weekly Pay*
1929	68,500	$ 95,116,000	49	$26.71
1930	60,800	85,096,000	49	26.92
1931	54,400	76,970,000	46	27.21
1932	51,600	70,595,000	46	26.31
1933	52,500	68,668,000	43	25.15
1934	57,300	79,773,000	39	26.77
1935	59,200	87,695,000	40	28.48
1936	65,800	95,913,000	39	28.04
1937	66,300	99,043,000	40	28.73
1938	64,000	103,488,000	40	31.10

Statistical Department, American Gas Association.

Natural Gas Steps In

In the 16-year interval from 1923 to 1938, manufactured gas has been replaced by natural gas or mixed natural and manufactured gas in communities with a population of nearly 19,800,000 people, and approximately 3,764,000 customers have been affected by the change. During this same period natural gas has been made available to over 2,300,000 customers in all parts of the country who had not previously been served with any gas fuel.

In considering this expansion of the natural gas industry, the question naturally arises of its relationship to other phases of the public utility business.

For example, it has been pointed out

that in 1939 revenues of the Electric Utilities aggregated $2,304,000,000, while revenues of natural gas utilities were only $445,971,000. Such a superficial comparison, however, ignores some of the basic differences inherent in these two branches of the utility industry, and has been responsible for many of the erroneous conclusions concerning the relative status and functions involved in the supply of gas and electric energy.

For example, in 1939 the electric companies sold to consumers some 107,000,000,000 kw. hrs. Reduced to a common denominator, or thermal basis, this amounted to 365 trillion B.t.u.'s. During that same year natural gas utilities sold 1,323,358,000,000 cu. ft. of natural gas, which reduced to the same common denominator or thermal basis, amounted to 1323 trillion B.t.u.'s, or nearly four times the quantity of energy distributed in the form of electricity.

A Bargain For Sure

Reducing these astronomical figures to unit terms may perhaps make this point clearer. If a buyer were in the market last year for a million B.t.u.'s of energy, he could purchase them in the form of natural gas for $0.34, and in the form of electric energy for $6.31.

It is doubtless for this reason that the electric industry is to an increasing extent, turning to natural gas as an economical and dependable method of power production. In 1939 approximately 191 billion cu. ft. of natural gas were used as fuel for generating electric power. That is to say, nearly one-fifth of all the steam generated electricity of this country was produced by natural gas.

The increasing acceptance of natural gas as the ideal fuel for domestic purposes is indicated by the results of a recent survey. Reports were received covering the utility characteristics of more than 117,600 one and two family homes constructed in 1939.

Of the 117,600 homes reported on, 76,900 were located in territory served with natural gas. For this latter group of new and modern dwellings, 92% reported the use of natural gas for cooking; 95% reported natural gas for water heating; 88% used natural gas for house heating; while 11% reported the installation of new gas refrigerators.

The fact that these dwellings represent the most modern conception of design and serviceability, affords additional assurance of the continued progress and expansion of the natural gas industry.

Converting An Oil Pipe Line To Natural Gas Transmission

By O. C. IRVINE

UNITED Gas Pipe Line Co., Houston, Texas,* in keeping with its policy of providing an adequate supply of gas to the territory which it serves, and to meet the growing demand for natural gas in the New Orleans area, recently entered an interesting and historic region for additional reserves.

The task of changing over a 25-mile, 6-in. oil line into a natural gas carrier was an unusual and difficult undertaking. The work ended in success, however, and on November 7, 1939, at 7 a. m., gas from The Texas Co.'s Lafitte field was turned into the Louisiana Power and Light Co.'s 18-in. line at Marrero station for delivery to West Bank customers.

The approximately 25-mile, 6⅝-in. O. D. line was used formerly for the transportation of oil from The Texas Co.'s Lafitte field to storage in their Marrero tank farm for later shipment by boat from the Port of New Orleans. The center of operations for the Lafitte field is a dredged island at the west side of Dupre Cut-off which connects Barataria Bay with the Barataria canal. Derricks are mounted on barges which are sunk on location and floated again when the rig is to be moved. All drilling is of the marine type. Operators live in houseboats. Supplies and drinking water are hauled in by boat; and the last 10 miles of a trip from New Orleans must be made by boat.

The starting point of the line is 10 miles below Lafitte Landing. It crosses Dupre Cut-off and follows the cut-off canal to Bayou Des Oies (pronounced zwa and meaning "goose"), then crosses the intracoastal canal at Wagner's Bridge, near Crown Point. An 18-in. drip was installed on the south bank and main line gate No. 1 on the north bank of Bayou Des Oies. A second 18-in. drip and gate No. 2 are located at Crown Point.

From Crown Point to Marrero, the line traverses a waste of salt marsh, jungle and swamp land, palmetto breaks and forests of cypress and moss-covered water oaks. Marrero station is located in the southeast corner of The Texas Company's tank farm between the Celotex plant and the ferry.

In making the changeover from an oil conveyor to a natural gas transmission line, it was necessary to clear the line of all oil. Under conservation department restrictions, it was imperative that oil wastes be kept from bayous and swamps because of ill effects on fish and wildlife. For that reason it was decided to flush the oil out by forcing water through it and then purging the line of water by the use of gas.

The line was found to hold 5000 barrels of water, and an attempt was made to purge the entire length from Lafitte to Marrero in one operation. Three thousand five hundred barrels of water was forced into a 60,000-barrel tank, leaving 1500 barrels in the line which could not be removed by this method. It became necessary to cut the line at three points to get all the water out. Cuts were made at Bayou Des Oies on November 4; at Crown Point, November 5; at Marrero, November 6; and purging with gas was completed.

On the gas purges, restrictions of the conservation department held gas volume down. Ample pressure was available, but volume was insufficient to clear the line of water. To overcome this handicap, gates were closed, pressure built up and then released in short blows. This operation had to be performed as many as six times to clear the separate sections.

On the section from Lafitte to Bayou Des Oies, six hours was consumed before gas finally came clear. In purging the Marrero and final section, a blow-off line was laid to a drainage ditch at the center of a 40-acre tract to get away from heavy traffic on the Marrero road. Wind, however, was favorable, blowing the gas away from the road and toward the tank farm.

The line was completely purged of water at 12 o'clock Monday night. It was tied into the Marrero meter station, and delivery began at 7 A. M. Monday, November 7.

H. F. Carr, Baton Rouge district manager, was on hand throughout the Lafitte-Marrero job. V. E. Turner, pipe line foreman, was in charge of pipe line crews; J. L. Bugg supervised the measurement equipment.

*Excerpts from an article published in the *United Gas Log*, United Gas Pipe Line Co. house organ.

DRILLING FOR NATURAL GAS

Three Miles Down

By J. H. THACHER, Jr.
Standard Oil Company of California

• IN HIS REMARKS before the Pacific Coast Gas Association's annual convention in 1939, F. F. DOYLE, Pacific Gas and Electric Co.'s Natural Gas Division Manager, stated, "I would like to recommend that the Technical Section of this Association devote a little more time each year to natural gas production problems.... Such work might parallel that of other oil or geological associations, but it would be beneficial to those in the gas business...." A partial answer to Mr. Doyle's suggestion was made by Southern California Gas Co.'s R. M. BAUER (chairman this year of P.C.G.A.'s Natural Gas Production sub-committee) with the publication of his paper, "Natural Gas Production and Supply in California." (G A S, September, 1939, p. 33.) The present contribution by Mr. THACHER is a further development of the original suggestion. It is a paper written in non-technical language and especially for the gas man that outlines the tremendous strides made by the producing companies in the past 10 years in the art of drilling and bringing in deep wells. This paper was presented by Mr. Thacher under the title "Deep Drilling in California" before the Spring Technical Conference of the Pacific Coast Gas Association, held at the Embassy Hotel, Los Angeles, April 11 and 12, 1940.—Abstract by GAS.)

J. H. THACHER

IN the search for oil and gas, those structures have been discovered first which could be mapped from surface outcrops and those horizons tapped first which were nearest to the surface. As these sources were depleted and as the geologist and geophysicist joined forces to discover with seismograph, magnetometer and other instruments, possible oil-bearing structures at depth, the search necessitated deeper and deeper drilling. This in turn was accomplished through the improvement in the quality of steel present in all forms of oilfield equipment permitting it to withstand the increase in stress depth places upon such equipment.

Evidence of this improvement is shown in the depth record since the end of the last century. (Fig. 1.)

A companion to increased depth has been increased speed of drilling. A 1000-ft. well drilled 40 years ago required some 135 days to complete — an average penetration of 7.4 ft. per day. Recently a well finished in the Wasco field in Kern County at a depth of 13,150 ft. was drilled in 86 days — an average of 153 ft. per day. Similarly, in the Midway field, in Kern County, a 3000-ft. well 25 years ago required 170 days to complete, an average of 17.7 ft. per day, as compared to current drilling time of 12 days or 250 ft. per day.

Drilling Method

The earlier wells were drilled with the percussion or cable tool method, but all the more recent were drilled with rotary. The latter method comprises essentially four elements, a cutting tool or bit, a revolving motion applied thereto, the application of pressure by the bit against the material drilled, and a means for cooling and lubricating the bit and removing drill cuttings.

Increased depth with its heavier load in the form of long strings of drill pipe and casing, require a type of derrick and power equipment materially stronger and more powerful than comparable equipment 10 years ago.

Today the short wooden derrick and its successor the 88- or 122-ft. steel derrick are supplanted by the 136-, 150- or 178-ft. steel derrick. The last mentioned is probably the largest in regular use, having a 32-ft. base and a carrying capacity dependent upon the character of steel ranging from 680,000 to 950,000 lbs. Occasionally a dual taper derrick is used as at Wasco (Fig. 2) to provide more space both for racking drill pipe and for movement of the hoisting equipment. In these taller derricks stands of drill pipe 120 ft. in length can be handled instead of the more usual 88-ft. lengths thereby increasing the speed with which a long string of pipe can be broken down or made up. When 2½ miles of drill pipe are required to put the bit on the bottom, this is obviously a factor of importance. The 32-ft. base is designed to permit operation of large drawworks equipped with long drums and hydromatic brake and also to allow racking more drill pipe. Modern derricks are equipped with extended legs, eliminating to a large extent the necessity of expensive concrete piers, and the increased floor height of 6 to 8 ft. provides a large open cellar requiring less excavation for well head equipment.

At the top of the derrick the crown block is now made with sheaves 33 to 35 inches in diameter and the block is capable of handling loads of 350 tons. Correspondingly heavier and stronger hooks, swivels and casing lines are standard equipment.

The power units required for a modern rig can be grouped into:

1. The hoisting unit or drawworks required to raise or lower equipment in the hole.
2. The rotating unit required to rotate the drill pipe and bit.
3. The mud pumps which provide the power to circulate the drilling mud.

In the past it has been common practice to operate the first two — the rotating and hoisting units — with the same engine, but the trend today is to operate the two with a separate power unit for each with resultant greater flexibility.

Modern Hoisting Unit

A typical modern hoisting unit consists of a three or four speed drawworks with 60-in. diameter brake drums, 34-in. diameter by 41-in. long reeling drum grooved to handle 1¼-in. casing line and equipped with 3⅛-in. double chain with both chain and sprockets run in oil-tight enclosures lubricated by a continual spray of oil. A pump forces oil through individually controlled feed lines to each chain enclosure where it is sprayed over the chains and returned by gravity to a reservoir. To supplement normal brake equipment there has been developed the double rotor hydromatic brake consisting, as the name implies, of double rotors built on a shaft connected to the drawworks shaft, the rotors operating in a fluid within a housing. Hydromatic brakes are "energy absorbers" which save wear and tear on self energizing friction brakes, although the latter actually hold the load. A very recent development permits the hydromatic brake to be dis-

engaged from the drum shaft when not in use, thereby reducing wear on bearings, packing and drum shaft.

The drawworks (Fig. 3) may be powered by a horizontal or vertical engine. A horizontal type frequently seen is a 14- by 14-in. twin engine operated with speeds up to 400 r.p.m. developing approximately 1200 hp. at 350-lb. steam. A larger 15- by 14-in. engine rated at 1700 hp. operating on 500-lb. steam, has been successfully used at Rio Bravo to provide an exceptional reserve of power for fast, deep drilling.

The rotary table through which the rotating motion is applied to the Kelly and thence to the drill pipe and bit, if powered from the drawworks, is operated by chain drive. The separated unit may consist of 51⅝-in. diameter rotary table lubricated with an oil bath and directly connected through a geared device for regulating speed to a vertical steam engine located either on or just below the derrick floor. In the latter location increased space is made available for larger drilling equipment on the derrick floor.

Heavy duty internal combustion engines as well as electric and diesel power, are in use depending on the preference of the operator and on conditions in the area.

The severe loads in deep drilling have brought improved boiler design, including higher working pressure, more efficient superheating and the use of a central steam generating unit suitable for drilling successive wells without moving the boilers. A modern five-boiler plant may consist of the 150-hp. type with 350 lbs. working pressure with 60 per cent efficiency developing 60,000 lbs. of steam per hour. Unitized boiler feed water plants now in use provide almost automatic action, including water softening and preheating equipment.

Mud Laden Fluid

The importance of the mud laden fluid in deep drilling lies in the four vital functions which it performs:

1. To lubricate and cool the bit.
2. To carry to the surface, formation cuttings drilled out with the bit.
3. To coat the walls of the hole with a mud surface which will prevent the formation from absorbing mud or water and yet not create a constriction within the well bore sufficient to impede the passage of drill pipe.
4. To control by weight the native pressure of fluids contained in horizons penetrated.

Power to circulate this life blood of the drilling well is transmitted by the mud or "slush" pumps which have been steadily enlarged until an 18-in. (diameter of steam cylinder) by 8-in. (diameter of fluid cylinder) by 20-in. (length of stroke) duplex steam pump is being widely used. This type has a normal displacement of 327 gals. per minute and a maximum of 654 and is designed for 3000 lbs. maximum fluid pressure.

The remarkable ability of modern tubular goods to withstand the stress of compression and tension has permitted attainment of present depths. Grade "D" drill pipe used several years ago had a minimum yield strength of 55,000 lbs. per sq. in. Improved steel has resulted in yield strength of 80,000 lbs. per sq. in. with resultant factors of safety adequate for deep wells.

Better fabrication of casing is illustrated by the fact that, using safety factor of 2 in collapse and 2½ in tension, a safe setting depth of the old 6⅝-in. — 28-lb. lapweld steel casing was 4069 ft. in collapse and 3746 ft. in tension, while that of the present seamless alloy pipe of the same weight is 9480 ft. in collapse and 9100 ft. in tension.

Bits are divided into three general types — drag, disc, and rock. The last is often preferred for harder formations encountered in deep drilling and consists of a series of wheels in whose perimeter teeth have been cut and whose revolving, digging action is supplemented by a chipping action on hard surfaces. Longer individual bit life has been made possible by hard facing materials of which tungsten carbide is frequently used, having a scratch hardness of 9 to 9.5 on the Mohs scale with a compressive strength of 200,000 lbs. per sq. in. If a bit faced with such material will make five to eight times as much hole as the ordinary tool steel bit, it is apparent that bit replacement by pulling and rerunning drill pipe is reduced and drilling speed increased thereby.

The higher temperatures and pressures encountered at depth have resulted in the development of slow setting, high temperature cement to allow sufficient time for cement to be pumped into place when setting long strings of casing. Improvement in this field is important as the failure of a cement job at depth is especially costly, in point of time and materials.

Drill Performance

We have considered briefly the type of modern oil field equipment used in the physical drilling of deep wells. As the bit has not yet been equipped — at least not to my knowledge — with an all-seeing eye through which one can observe and record the character of the formation penetrated, it has been necessary to develop instruments for securing accurate and comprehensive data on the performance of the drill and on the horizons through which it passes.

Safety of men and equipment in deep drilling requires the driller to keep a close watch on the weight on the bit, on rotary speed, on mud pressure, and on load placed on the derrick. On a panel opposite the driller's position, a modern rig carries an indicating device consisting of a fluid filled diaphragm connected to a dead line which by deflecting a small portion of the line supporting the drill pipe hydraulically measures the load on each line and indicates the weight on a pressure gage. For example: The

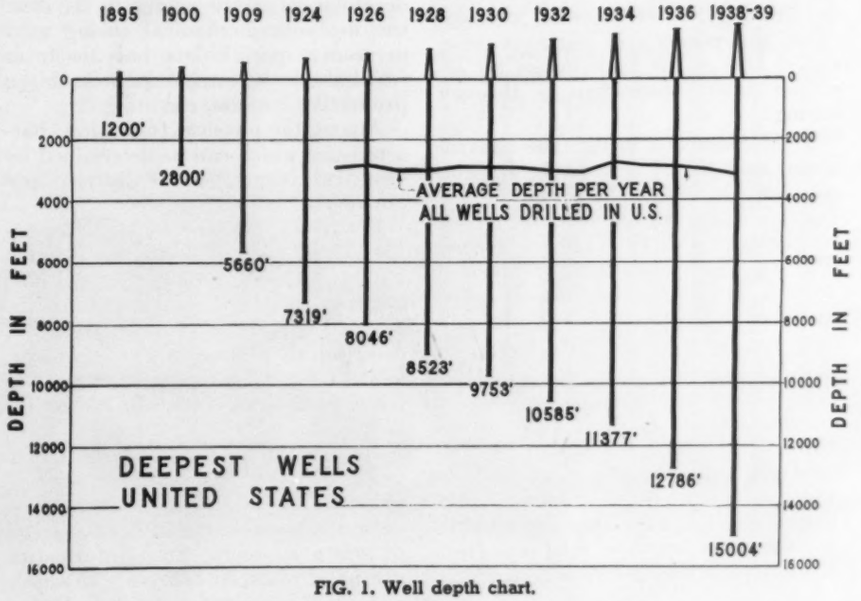


FIG. 1. Well depth chart.

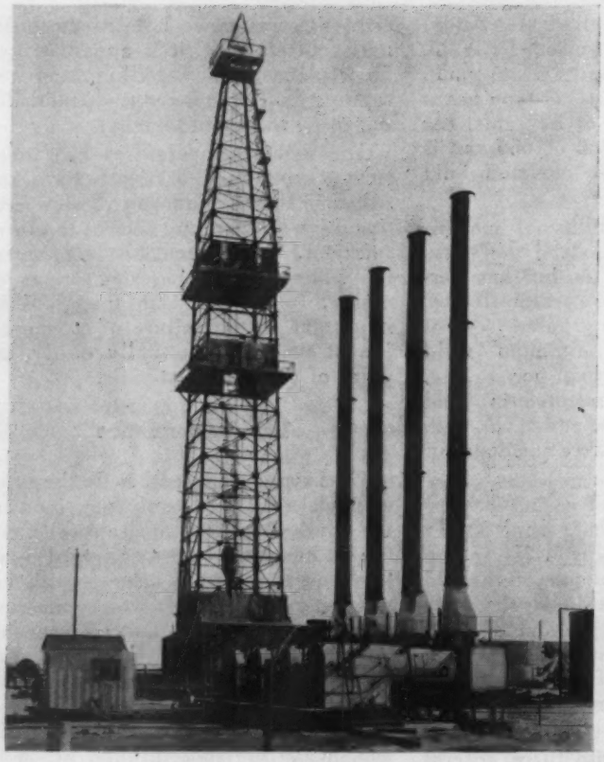


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FIG. 2.

Dual taper derrick (178-foot), 350-pound steam generators and superheaters used at Wasco.

▼

working strength of 1¼-in. line is 25,000 lbs., the breaking pressure 125,000 lbs. These limits must be considered in all operations. In addition, a pressure gage indicates mud pressure, another, steam pressure in the engine manifold and a tachometer indicates the rotary speed of the drill pipe.

Coring Procedure

The geologist and petroleum engineer require accurate data on gas, oil and water content of horizons at significant depths as well as information on lithology, fossil content, permeability and porosity of horizons penetrated. One of the basic means for securing such information is through coring.

1. *Mechanical Coring.* The conventional core barrel is a device for cutting out a section of the formation and forcing it up within a barrel which can accept up to 15 or 20 ft. of core. The core barrel can then be removed from the well by pulling the drill pipe and core then extracted.

2. *Wire Line Core.* In an effort to cut down coring time, the wire line core barrel has been evolved which permits the inner barrel in which formation is to be retained, to be lowered and withdrawn from its place in the drill pipe by use of a wire line, thus eliminating the necessity of pulling the entire length of drill pipe from the well each time a core is taken.

3. *Side Wall Core Sampler.* A recent innovation is the side wall core sampler used for taking formation samples and consisting of a series of small hollow cylinders lowered into the hole on a wire line which can be forced into the sides of the bore hole by a charge of powder. These cylinders can then be extracted into the tool, each cylinder retaining a small section of the formation.

Electrical logging is a means for determining the character of formations penetrated without physically removing cores from the hole. Its value lies in the rapidity with which data can be secured and in the decreased time required for mechanical coring. Once the formations in an area have been correlated with the electric log and have checked reliably from well to well in initial completions, further development can be guided by the electric log with mechanical coring used to secure special data only such as fossil markers, actual samples of the productive horizon, etc.

Among the physical formation characteristics which can be determined by electrical logging are resistivity and porosity.

Electrical instruments are also employed in the problem of locating water which has broken into the hole from an unknown source. One of the devices employs a photo-electric cell designed to pick up the less opaque quality of mud at the point of dilution from salt water inflowing from the formation.

Research in the field of Polar Orientation of Cores supplemented with directional surveys has assisted the geologist in determination of dip and strike of strata at depth. Such information can be of material assistance in checking the position of the well with relation to the geologic structure being tested.

The formation tester was designed to permit a production test to be run on a given section of formation without the necessity of running and setting casing. It is widely used in all fields and is especially helpful in an area which is being prospected for the first time for possible dry gas horizons, for in these areas it is sometimes very difficult to determine from core and electric log as to the gas possibilities of successive sand bodies. The most usual type of formation test requires the cutting of a small diameter hole or "rat" hole for the desired distance into the formation to be tested, leaving a circular shelf or shoulder at the junction of the smaller sized rat hole and normal sized bore hole. A tester consisting of a steel encased series of valves is attached to the bottom of the drill pipe with a packer just above the tool. As the tool is run into the hole, valves prevent well fluid from entering the drill pipe. On reaching the formation to be tested the lower extension of the instrument enters the rat hole and the packer, when settled firmly on the shoulder, acts as a sort of cork to prevent mud from the upper portion of the hole entering the rat hole. The valve in the tester is opened and the differential between the pressure in the formation and atmospheric pressure in the drill pipe allows oil, gas or water from the formation under test to enter the tool and drill pipe. On conclusion of the test the main valve is closed and the entrapped fluid in the drill pipe is brought to the surface for sampling and analysis in the laboratory.

Further data may be secured by attaching to the tester an instrument for recording bottom hole pressures. Another use for this instrument is for testing the effectiveness of a cement job after casing has been run and cemented in place, and with this tool a test to determine whether water has been shut off can be made in a few hours.

Survey Instruments

Wide deviation from the vertical was a common failing of early wells and has resulted in many complications from a legal and operating standpoint. Today wells may be deliberately deviated to tap a horizon over which, for surface reasons, a well cannot be conveniently located, as, for example, shore drilling for oil deposits underlying the ocean. At Elwood three to four producing wells have been drilled from the same pier under the ocean floor by means of directional drilling. Similarly, in areas with complex faulted structures, wells on the non-

productive side of the fault may be redirected to the other side and successfully completed as producers. We have records of wells that have been deflected as much as 3200 ft. horizontally from their surface location and a deviation as great as 60° from vertical has been reported. In case of a serious oil well fire, a well can be drilled from an adjacent location and so directed as to meet the bore hole of the well which is on fire, thus permitting the latter to be extinguished by injecting mud or other fluid.

Normal practice, however, requires straight hole drilling and the perfection of several types of surveying instruments has made possible a high percentage of successfully completed wells with more effective reservoir drainage and greater accuracy in the determination of sub-surface structural conditions.

Deviation Device. This type of device found its origin in the acid bottle which was simply a glass tube filled with a mixture of water and hydrofluoric acid lowered down the drill pipe and allowed to stand until the acid had etched a line around the inside of the tube. Deviation vertically could be interpreted by measuring the angle of etch as compared to horizontal. Other types of instruments were later developed which could be lowered on a wire line to secure deviation at a single station.†

Magnetic Single Shot Instruments. This type of instrument is useful in those cases where both deviation and direction of drift must be known. These instruments are lowered into an uncased hole to obtain a single reading usually just above the bottom of the hole.

Complete directional surveys of the entire length of hole, both cased and uncased, are obtained by two methods.

(*a*) *Oriented Survey.* In this case the instrument is lowered to the bottom of the well on drill pipe or tubing and deviation recorded at successive stations, and direction readings secured by measuring the natural rotations of the pipe.

(*b*) *Gyroscopic Survey.* This method employs a gyroscopic compass to obtain direction and can be run either on a wire line or on drill pipe.

Drilling of a Deep Well

Having reviewed some of the more important elements of power, drilling and data furnishing equipment in use today, we might briefly summarize the progress of a deep California well drilled with heavy equipment. Assume we have selected a 178-ft. derrick with a 32-ft. base, having a vertical capacity of approximately 500 tons; a power plant consisting of five 500-lb. boilers with integral superheaters each rated at 130 hp.; a drawworks consisting of a 15- by 14-in. engine rated at 1700 hp.; mud circulation furnished by two 15½- by 9¼- by 22-in. pumps; rotary table driven by 12- by 12-in. engine with speeds up to 350 r.p.m.

Our casing program will require 1500 ft. of 13⅜-in. by 48-lb. surface pipe used to cement off surface water. Seven-in. casing run in three different weights ranging from 26 to 32 lbs. will be cemented at approximately 11,500 ft. The heavier pipe may be run on bottom to provide a higher safety factor in collapse. If a water shut-off is secured on the 7-in. cement job, a 250-ft. perforated liner of 5-in., 21-lb. pipe will be run and set opposite the oil sand. Coring at intervals may have started at 8000 ft. to pick up horizon markers, and an electrical log run on completion of estimated total depth as a check on location of water sands and possible oil sands.

If we are fortunate we may have secured a penetration performance as follows:

Feet Drilled	*Feet per Day*
0 - 2,000 at an average of	666
2,000 - 4,000 at an average of	1,000
4,000 - 6,000 at an average of	670
6,000 - 8,000 at an average of	330
8,000 - 10,000 at an average of	500
10,000 - 11,500 at an average of	95

The perforations in the liner and the walls of the producing section will be washed as a precaution against mud cake on the walls of the sand and to eliminate cavings which may have fallen into the annular space outside the liner, preventing passage of oil from the producing sands into the well bore. Washing may be done with mud, water, oil, or in some cases acid, or a combination of these elements, depending on conditions and preferences of the individual in charge. The washer is designed to wash fluid through a short section of perforations and after cleaning one section the washer is raised to the section immediately overlying and the process repeated until the entire perforated section has been washed.

Bringing In the Well

On withdrawal of the perforation washer the next step is to place the well on production either by flowing, gas lift, or pumping, depending upon reservoir conditions. As we hope the well will flow, the 2⅞-in. tubing is run and flow connections, or Christmas tree, installed. Methods of bringing the well in are by circulating, swabbing or gas lift or by a combination of these methods. The object of circulating is to replace the mud fluid in the well with a lighter fluid such as water, or oil, thus reducing pressure on the oil sands. Frequently this change in fluid alone reduces the sand face pressure to such point that the well will begin to flow. It may, however, be necessary to swab the well or to inject high pressure gas into the casing, thus forcing the fluid out through the tubing and lowering the fluid level and hence the hydrostatic head against the sand.

When the well has been caused to flow and has been thoroughly cleaned out, it is customary to run a potential test for a required number of hours, the rate and pressure data being forwarded to the Oil Umpire in Los Angeles so that in the succeeding month an allotment will be received. For March 1940 in California, the maximum was 182 barrels per day per well.

The many variables entering into the final cost of a well make it difficult to generalize as to well costs in this state, but a range might be established as from $8 to $25 per ft., the difference being attributable to the amount of casing required, difficulty of drilling and amount of testing and other special work required.

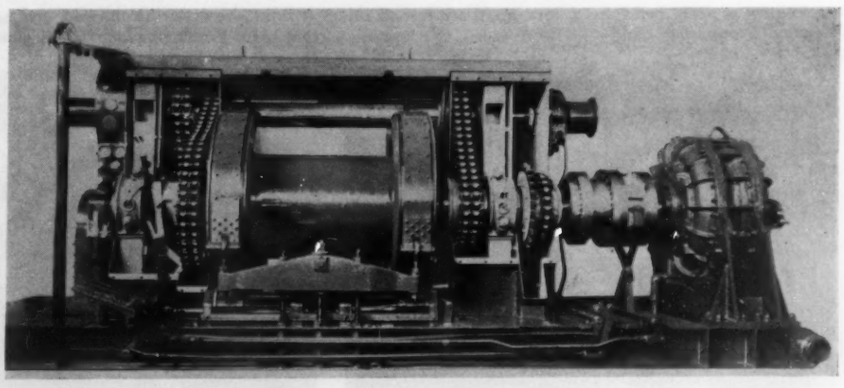

FIG. 3. Cutaway view of heavy type drawworks with hydraulic brake at right.

†"Progress in Drilling Oil Wells," W. A. Eardley, A.I.M.M.E., July 12, 1939.

A crew applies hot enamel by rolling rig during extremely cold weather in Kansas. —Photo by Barrett Co.

Panhandle Eastern Pi

$3,500,000 LOOP L

BY the first of July of this year the Panhandle Eastern Pipe Line Co., Kansas City, Mo., is scheduled to complete a series of construction projects costing some $3,500,000. The expansion program involves the installation of 137 miles of loops along the company's existing line that carries natural gas from the Texas Panhandle and Hugoton, Kan., gas fields to the Illinois-Indiana state line, where it is turned into the system of the Michigan Gas Transmission Corp., and delivered to Detroit. The new construction work will enable the Panhandle Eastern company to increase its delivery capacity 25 to 30 million cu. ft. per day, thereby meeting the growing demands of its largest single customer, the Michigan Consolidated Gas Co., of Detroit, and the increased requirements of the cities and towns of Kansas, Missouri and Illinois receiving service from this line.

The present building project is the third of major proportions since the line was first built in 1936 in order to bring natural gas service to the Detroit area. (See *G A S*, September, 1936, p. 12, Detroit Souvenir Issue.) To go back a bit in the company's history, the first expansion made by the company took place late in 1936, when the existing compressor horsepower was tripled by the addition of 29,300 hp. through the construction of seven new compressor stations. In that year also an absorption gasoline plant and a gas dehydration unit were built, and two submerged crossings of the Mississippi River were completed.

The second phase of the company's expansion took place in 1937 when 29,000 compressor horsepower were added to six of the company's existing stations, and a new station at Tuscola, Ill., was built. (*G A S*, May, 1937, p. 17.) In that same year the company made its first major addition to transmission line facilities with the construction of 290 miles of main loop lines, with the building of the second multiple line crossing of the Missouri River (*G A S*, October, 1937, p. 24), and with additions to its gas gathering lines in Southwestern Kansas.

Phase No. 3 of Panhandle Eastern's expansion, the pipe line projects under consideration in this article are listed:

1. At Liberal, Kan., a loop 15.48 miles in length, 24-in. O.D. pipe, already completed.

2. At Greensburg, Kan., a loop 23.17 miles long, 24-in. O.D. pipe, now completed.

3. At Haven, Kan., a loop 16.59 miles long, 24-in. O.D., now completed.

4. At Olpe, Kan., a loop 15.50 miles long, 24-in. O.D., started in April.

5. At Louisburg, Mo., a loop 8.25 miles long, 24-in. O.D., completed.

6. At Houstonia, Mo., a loop 3.89 miles in length, 18-in. O.D., and another loop 8.04 miles long, 22-in. O.D., already completed.

7. At Centralia, Mo., a loop 18 miles long, 22-in. O.D., started.

8. At Pleasant Hill, Ill., a loop 10.72 miles long, 22-in. O.D., not yet started.

9. At Glenarm, Ill., a loop 17.08 miles long, 22-in. O.D., not yet started.

In addition to the pipe line work listed above, which is to be completed by July 1, the company has started work on the construction of additions to its Glenarm, Ill., compressor station. This work will consist of the extension of the main building and the installation of one 1000-hp. Cooper-Bessemer compressor unit, a cooling tower basin and tower, a gas scrubber and other incidental work. Other work contemplated under the program will include the enlargement of the gasoline absorption plant and gas dehydration unit at Liberal, Kan.

Work was scheduled to begin on the project on December 26, 1939, but on that day the entire Panhandle Eastern system was blanketed under a foot of snow, and the states of Kansas and Missouri were experiencing some of the severest winter weather in history, with temperatures in Kansas dropping to 10° and in Western Missouri to 20°. Snowdrifts blocked most of Kansas, and travel was virtually impossible.

In spite of these unfavorable conditions, actual work was begun on December 28 with the stringing of 24-in. O.D. pipe for the extension of the Liberal loop, near Meade, Kan., and the

Backfilling a side bend in a low spot on the 22-in. Houstonia loop. —Photo by F. S. Young

A light snow on the thawed ground makes the going tough during construction of the 22-in. Houstonia loop in Missouri. —Photo by F. S. Young

PRINT IN BINDING

rn Pipe Line Company's

OPLINE PROJECT

A section of the 24-in. Liberal loop is lined up over the ditch, ready for couplings. —Photo by Barrett Co.

Louisburg loop near Warrensburg, Mo.

As the work went forward, construction crews experienced the coldest January in the history of the Kansas City Weather Bureau. The ground froze to a depth of 18 to 24 in. as temperatures as low as 16° below zero were recorded, and days came and went when the thermometer registered a high of 10°. The snow continued to fall, and the Kansas plains remained cloaked in white for a longer continuous period than ever before recorded. Stringing trucks, loaded with pipe, became stuck in snowdrifts, and "cats" were pressed into service to push or haul them to their destinations. Cutting through the frozen earth, the ditching machines proceeded in tandem, forming their windrows of "steaming" earth. Welders, working close to hot salamanders, sought protection of windshields.

Most difficult under these trying conditions was the application of the paint, but the Panhandle Eastern engineers discovered that the use of a plasticized enamel, without the addition of flux, proved to be the best means of combating these subnormal temperatures. The enamel was used also to coat couplings without the addition of flux. This paint, which remains slightly plastic under normal pipe line operating temperatures, was applied in atmospheric temperatures as low as 10° above zero. The finished coat was tested with a holiday detector, thin spots and holidays were daubed, and the detector was then passed over the enamel for a final check.

Under these conditions the pipe line work which had been started in December went forward on both sections of the line throughout January. In fact, with the exception of three days in Kansas and four in Missouri, when all work had to be suspended because of the extreme cold, snow, and high winds, each day in January brought some progress. It was not until late in February, when a thaw occurred, that pipe line construction was made impossible, and all work had to be shut down. Conditions were severest on the Houstonia loop in Missouri. Yet, in spite of these trying conditions, good organization and modern pipe-laying equipment has enabled the Panhandle Eastern company to proceed with its project with few major interruptions, and two loops were completed and in service by the first week in February.

Loops were located a minimum of 50 ft. from the original main line, except in areas where unfavorable terrain made this practice impossible. The eastern half of the Centralia loop, for example, was relocated in a valley, whereas the course of the original main line lies directly through the hills to the Mississippi River. Although this necessitated leaving the main line a maximum of 1½ miles at the farthest point, a more favorable location was secured. Special attention was given to location surveys and in some instances alternate routes were surveyed before a final location was selected. Final surveys of the completed work were made immediately. The pipe line was constructed in the usual manner — two 40-ft. lengths being welded together in the field, the resulting lengths then being connected with mechanical type couplings. General practice was to use chill rings with two bead application of weld metal. Where chill rings were not used, the pipe weld was made in three beads.

A. O. Smith Corp., Milwaukee, furnished all pipe used on the 24-in. loops, and the National Tube Co., Pittsburgh, supplied all pipe used on the Houstonia loop and all lines east of Houstonia. The pipe coating used on all lines in Kansas was Barrett Co., New York, Water Works Enamel, while Bitumastic No. 70B was the enamel applied to the lines in Missouri and Illinois. Main gate valves were Crane Co., Chicago, 24 by 20 in. and 22 by 18 in., iron body hard metal trimmed O.S. & Y. flanged and double disc gate valves with spur gear and brass stem, F. & D. Series 30.

With the exception of one inspector, all engineering and inspection work is handled by regular company employes, the work being in the direct charge of J. W. Hall, of the company's engineering department, acting under the general supervision of J. C. Reinbold, general superintendent of the company.

The Houstonia loop as it appeared in April not long before the project was completed. The loop consists of some 12 miles of 22- and 18-in. pipe. —Photo by F. S. Young

Mud adds to the construction difficulties on the 22-in. Houstonia loop. —Photo by F. S. Young

Recent Progress

By HENRY N. WADE

Parkhill-Wade, Los Angeles

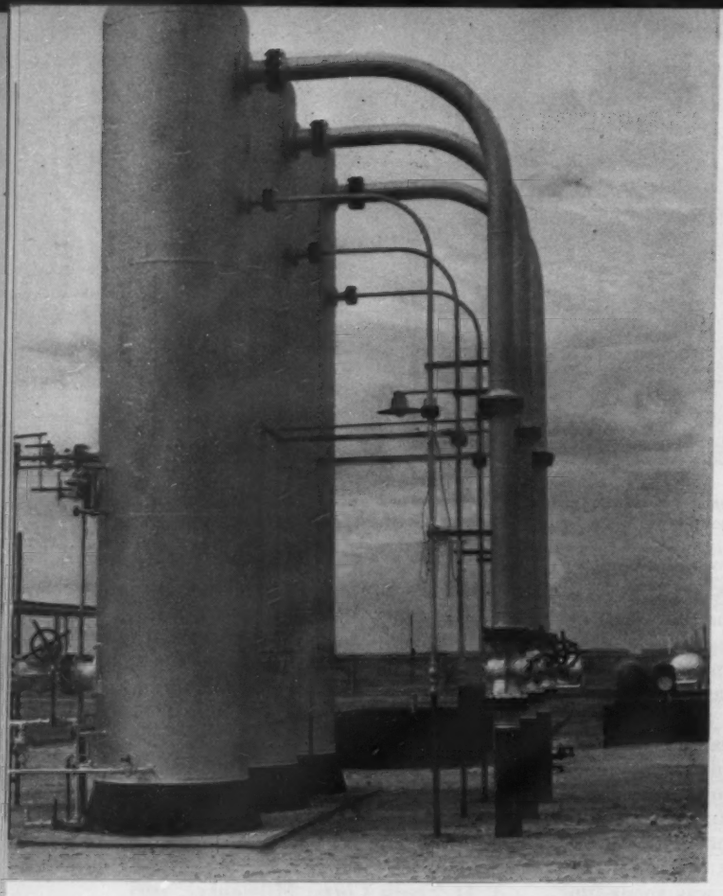

FIG. 1.
Calcium chloride dehydrating contactors at the Jal, New Mexico, plant of the El Paso Natural Gas Co.

THE general trend of development of dehydration methods has been toward plants of the type which utilizes a continuous circulation of some hygroscopic solution, with or without special means for cooling the gas to improve the water extraction.

The first commercial installation (1) of this type was made at the Cut Bank, Mont., gasoline plant of the Montana Power Gas Co. late in 1934. This plant uses a strong solution of calcium chloride as the dehydrant. The solution is circulated through a bubble-plate "contactor" and through cooling coils in an atmospheric water-spray cooling tower in a closed circuit under full line pressure; thus it serves the double purpose of cooling the gas and absorbing water from it by its hygroscopic action. The solution strength is kept approximately constant by boiling down a small side-stream taken out of the main circulation, and then returning the reconcentrated brine to the system.

This pioneer plant contains all of the elements which have been used in later plants. In many cases it has been possible to omit the feature of using the solution as a gas cooling agent, relying on the hygroscopic effect only (2), (5). However, in one case known to the writer it was necessary to go further with the cooling than is possible in a cooling tower; in this case the solution is cooled by a refrigeration cycle (3).

Hygroscopic Solutions

1. Calcium Chloride: Solutions of calcium chloride are still used where conditions permit, largely because of the cheapness and availability of the material. On account of the freezing-point characteristics of the strong $CaCl_2$ brines it is not possible to secure a dew-point depression of more than about 25° F. below the temperature of contact between the brine and the gas. In some cases this amount of depression is enough to protect the line against water deposition.

Calcium chloride solutions have several disadvantages which will probably cause them to be displaced by other materials. They cause severe corrosion of ordinary steel plate, steel or iron pump parts, etc., when in contact with air; they also disintegrate concrete. If the gas treated contains even traces of oxygen or hydrogen sulphide, the brine will corrode internal parts of contactors, piping, etc., if made of ordinary steel. No inhibitor has been developed for controlling such corrosion under all conditions. However, experience with several plants has shown that the brine will not corrode ordinary steel unless free oxygen or sulphur in the form of hydrogen sulphide is present. Carbon dioxide in amounts up to 3% or 4% of the gas and moderate amounts of sulphur in the form of mercaptans do not appear to accelerate corrosion. Fig. 1 shows a typical "battery" of contactor towers.

2. Calcium Chloride Mixed With Organics: The addition of certain organic materials, notably glycerine or diethylene glycol, to calcium chloride brine produces a liquid having a stronger affinity for water than the brine alone, and thus permits greater dew-point depressions. Several plants have been built using such solutions (4).

The operating data from the brine-glycerine plant show a dew-point of 35° F. in the outlet gas with a contact temperature of 74° F. at 300 lbs. gage pressure. This depression of 39° F. is not possible with straight brine. No data have been published from the plant which uses the diethylene glycol-brine solution.

It is the writer's feeling that these mixtures offer no advantages which cannot be secured better in some other way. They are not much cheaper than straight diethylene glycol solutions, they are nearly as corrosive and unpleasant to handle as calcium chloride straight, and they afford only about 65% of the dew-point depression attainable with diethylene glycol.

3. Glycerine: As far as the writer knows, only one commercial dehydration plant has been built to operate on straight glycerine solutions. In this plant the gas treated contained considerable amounts of oxygen, and the water was evaporated from the solution in contact with air. It was found that under these conditions the glycerine lost its hygroscopic properties rather rapidly, declining to about 70% of its original value in a few months. Chemical examination of the used glycerine showed partial oxidation and polymerization into new compounds.

The initial dew-point depression with fresh glycerine is limited to about

...s in the DEHYDRATION of Gas Pipe Lines

40° F., in order to keep the solution at a workable viscosity. Higher solution strengths become so viscous as to be practically useless.

It is the writer's opinion that there is no real advantage to the use of glycerine as compared with some of the other materials available. Its cost is about the same as that of diethylene glycol; it is subject to oxidation and polymerization under ordinary plant operating conditions; and solutions capable of producing dew-point depressions in excess of about 35° to 40° F. are awkwardly viscous.

4. Zinc Chloride: Some experimental work has been done on the use of concentrated zinc chloride solutions for gas dehydration. As far as the writer knows, none of the results of this work has been published. However, the following general facts are apparent:

All solutions of this material are exceedingly corrosive to ordinary steel, requiring that all contacting equipment, valves, piping and pump parts which come into contact with the solution be made of, or protected by, expensive grades of stainless steel.

It is possible to secure dew-point depressions comparable with those produced by the use of diethylene glycol solutions. However, such solutions are so heavily concentrated that their cost is nearly as great as that of the glycol.

5. Diethylene Glycol: This material has been gaining in popularity to such an extent that practically all of the dehydration plants which have been built during the past two years use it.

The first commercial pipe line plants using glycol solutions were those built at Skellytown, Texas, and Hugoton, Kan., for the Northern Natural Gas Co. These plants were placed in operation in January, 1937, and have been in continuous service ever since. At the time the plants were built no information was available as to the possible tendency of the glycol to break down under operating conditions, or to combine with components in the natural gas. These plants were carefully watched for signs of deterioration of the glycol. After a few months of service it became apparent that no deterioration was occurring, and glycol then began to be used in other plants.

In several instances glycol dehydration plants are operating on gas containing small amounts of free oxygen, carbon dioxide and sulphur compounds; there has never been any evidence of deterioration of the glycol under these conditions.

Experience with the eight plants using this material with which the writer is intimately familiar has demonstrated that it has the following advantages:

1. High Dew-point Depression. It is possible to secure dew-point depressions up to about 60° F. under normal operating conditions.

2. Desirable Physical Properties. The material is bland and non-corrosive, has a moderate viscosity and possesses slight lubricating properties which prevent wear and disintegration of pump parts, packing, etc.

3. It is chemically stable and does not deteriorate in service.

The only disadvantage is the high cost of the pure glycol, which currently runs around $1.45 per gal. f.o.b. point of manufacture.

Examples of Plant Design

Differing operating conditions on gas transmission systems obviously call for various plant designs to meet those conditions most economically. The following discussion covers some of the special arrangements which have been worked out to meet the requirements of the various pipe line systems.

Simple Solution Circulation Without Special Cooling: Plants of this type simply use the hygroscopic effect of the solution to secure the required dew-point depression. The selection of the most economical solution is, of course, determined by the degree of dew-point depression which is required. The simplest and cheapest type of plant is that in which calcium chloride brine is adequate; in other words, where a dew-point depression of not more than 25° F. is necessary. In this plant a small stream of brine is contacted with the gas in a bubble-plate contactor. The partially diluted brine is withdrawn from the base of the contactor through a float-controlled valve, and usually the entire stream passes through an open evaporator, where the excess water is boiled out by means of steam coils. The reconcentrated solution runs to a surge or storage tank, where it is cooled. The solution pump takes suction from this tank and delivers the concentrated brine back over the top of the contactor.

H. N. WADE

IN A PAPER entitled "The Dehydration of High Pressure Natural Gas," prepared in 1935 by Arthur B. Allyne for publication by the American Gas Association, a quite comprehensive review is presented of methods then available for dehydration of natural gas in high pressure pipe lines. Since Mr. Allyne's paper was written many more such plants have been built than then existed, and the general types have become more or less standardized. The purpose of this paper is to summarize this development. At the time when this paper was written, Mr. Allyne was affiliated with Southern Counties Gas Co., Los Angeles. He is now with the California Railroad Commission. — Author.

The strength of the solution may be automatically controlled by means of a temperature recorder controller which holds the solution temperature in the evaporator constant.

This same general type of plant may be used with diethylene glycol or glycerine solutions, except that a closed fractionating still must be substituted for the open steam-heated evaporator. It is necessary to supply this still with a small amount of pure water reflux in order to prevent loss of vapor of the expensive dehydrating material. The strength of the concentrated solution in the base of the still is maintained constant by a temperature recorder controller which regulates the input of heat to the still base heater.

A heat exchanger is frequently used to exchange heat between the concentrated solution on its way to the contactor and the dilute solution coming from the contactor. If this exchanger is designed for reasonably close terminal temperature approaches, no final cooling of the concentrated solution is necessary.

Cooling of Gas Stream by Solution: Where the simple system just described does not reach the required dew-point, its performance can be improved by

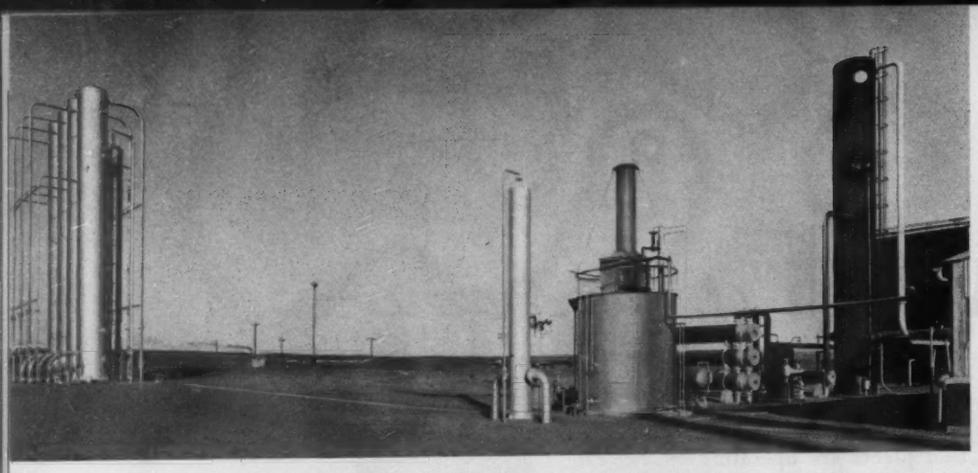

FIG. 2. Dehydration unit combined with gasoline absorption plant and refrigerated calcium chloride system constructed for the Panhandle Eastern Pipe Line Co. at Liberal, Kan. Left to right: absorbers with dehydrating contactors self-contained in the top; pressure surge chamber; solution storage tank with reconcentrator on top; absorption equipment.

lowering the temperature of contact between solution and gas. This can be done either by adding to the gas cooling facilities ahead of the dehydration, or by using the dehydrating solution itself to cool the gas. The latter arrangement is usually most economical, since the bubble-plate contactor which is required for efficient treating contact is also, without any important change in design, an extremely efficient heat exchanger. If it is necessary to maintain the treating temperature below the hydrate formation temperature of the incoming gas, this scheme of operation may be essential, since hydrates would form in preliminary coolers, but will not form if the cooling occurs in contact with a dehydrating solution. In such plants it is usual to design the solution circulation rate so that the heat capacity per degree temperature change per unit of time is the same for the solution stream and the maximum gas stream. The solution stream circulates at full line pressure through the contactor and through the external cooling means; thus the main circulating pump is required to supply only the pressure losses through this closed system. The solution strength is controlled by reconcentrating a small side-stream taken out of the main circulation, and returned after concentration.

The external solution cooling means may consist of atmospheric cooling coils or sections in a cooling tower, or refrigerative cooling, or both. The Cut Bank plant is an example of the first type; the Liberal, Kan., plant of the Panhandle Eastern Pipe Line Co. contains both atmospheric and butane cycle refrigerative cooling of the main brine circulation.

Miscellaneous Plant Types

Combination Dehydration and Sulphur Removal: It has been found that treating gas with mixtures of diethylene glycol and mono-ethanolamine will perform the double function of removing hydrogen sulphide and dehydration. Several such plants are in operation.

The general design of such a plant is identical with that of a simple glycol dehydration plant, except that brass and copper must be kept out of contact with the solution.

Combination Dehydration and Gasoline Extraction: In two recent plants it has been necessary to dehydrate the gas to an extremely low dew-point (about 0° F. at 1200 lbs.) as well as to extract gasoline from the incoming gas.

The most economical solution for this problem proved to be recovery of the gasoline by compression to 300 lbs. and refrigeration to about 0° F. at this pressure, combined with injection of glycol solution into the warm 300-lb. gas to prevent freezing and hydrate formation by the water in the gas. The final contact between the glycol solution and the gas at the 300-lb. separator temperature of 0° F. is reducing the dew-point of the residual gas to —24° F. At the same time the natural gasoline is being extracted with good efficiency. Fig. 2 shows a combination dehydration and gasoline absorption plant, using refrigerated calcium chloride solution.

Intermittent Supervision: Nearly all dehydration units are installed near absorption plants or compressor stations, where the small amount of attention required can be given the unit without adding an operator.

In one case it was desired to locate the dehydration unit at a remote location out on the line, under conditions which made it expensive to provide more than six or eight hours' supervision a day.

This condition was met by providing enough storage space for solution (calcium chloride in this case) in the top of the contactor shell to take care of a 16- to 24-hour run. The dilute solution is withdrawn from the contactor base by the usual level control, and is run to an open storage tank. Once every 24 hours the operator visits the plant and reconcentrates the solution, finally pumping it back into the storage in the contactor. This operation requires only four or five hours.

Solid Dehydrating Agents: As far as the writer knows, only one dehydrating plant using a solid dehydrant has been built during the past five years. This plant uses activated alumina for the dehydrant; its primary function is to remove water to permit subsequent cooling of the gas to around —30° F. for the purpose of extracting gasoline.

Reports from this plant indicate perfect performance of the dehydrating system. It is still early to know whether the alumina will be subject to the troubles which have been experienced with other solid absorbents, such as gradual clogging of pores, mechanical breaking down into dust, etc.

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By W. H. TIPTON, Jr.
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SEASONAL

Water Heater Campaigns Pay DIVIDENDS

PLUMBERS, water heater dealers, and gas utilities often raise the question, "Do water heater campaigns pay off in extra sales?" They often wonder if any direct results can be traced to a special water heater sales promotion. They wonder if the results justify the expense and work involved.

Down in the Gulf Coast region of Texas, Houston Natural Gas System officials wondered the same thing. They wondered if the local plumber, the hardware merchant handling water heaters, and the appliance shop would get behind any sort of organized program for promoting water heater sales and really get out and ring doorbells of prospects who had no water heating facilities, other than the proverbial teakettle. Serving a 400-mile strip along the Texas Gulf Coast, with no large towns in the system, it first involved the problem of having no water heaters on display, of prospects having to order from a catalog in many of the towns. It also faced the problem of selling these dealers on doing any kind of promotional advertising. The utility started with the policy of every sale being made by a dealer, of 100% cooperation, and no competition with the dealers.

Appliance Shows

In the fall of 1934, with approximately 12,000 homes served by Houston Natural Gas System in these 50-odd towns, a series of appliance shows of all gas appliances was held, with the utility cooperating with distributors in arranging for displays, since few models of any appliances were available locally. In connection with these shows, a special offer and advertising program was arranged with water heater dealers. This involved a down payment of $3.00 to install a water heater, with dealers contributing $5.00 each to a promotional advertising fund, this amount to be paid only if the dealer got at least one sale! Two mailing pieces and two newspaper advertisements run in local papers over the cooperating dealers' signatures constituted the campaign for a two-week period. A little over 200 of the 537 sales of water heaters reported for 1934 were made in this period, and with the quota for the campaign exceeded, a program of seasonal water heater campaigns was launched.

That spring and fall campaigns for water heaters is a sound program is evidenced by the fact that 12 consecutive campaigns have been held in the period from October, 1934, through February, 1940, and every campaign has exceeded quota! In the five-year period, 1935 through 1939, 51.5% of the years' water heater sales have been made in the two seasonal campaigns each year — 3991 of the 7757 sales being made in campaigns. This has been accomplished by constantly changing the appeal of the campaigns, of selling automatic hot water service, rather than any given brand of water heater. And dealers have assumed their share of the load by running the newspaper advertising in local newspapers over joint signatures, each paying his pro-rata cost of this space. The utility's contribution has been the planning of the campaign, preparation of all art work, engravings, type composition, and furnishing the advertisements in mat form to newspapers; plus the preparation and mailing of direct-mail pieces. This amounts to an approximate 50-50 sharing of costs. Each campaign is prepared in portfolio form, including pre-prints of the complete newspaper advertisements, and submitted to dealers prior to the campaign. The gas system representative talks with each dealer, explains the portfolio to him — and leaves a copy with him — and gets him to sign an authorization to his local newspaper authorizing the paper to bill him for his pro-rata share of the local newspaper advertising. This authorization and the mats are mailed to the local newspaper editor by the gas system's advertising department.

To those who might wonder about plus-sales resulting from this activity, the five-year (1935-1939) record of month-by-month sales (Table No. 1) should prove convincing.

Although it is hardly necessary, campaign months are shown in bolder figures. After experimentation with periods in February and March, September and October, it has been found that February is the best spring period (we have early spring weather in South Texas), and September the best fall period, for water heater promotions. The duration of a campaign has been moved up from a two-week period in 1935 to three-week periods, and finally a whole month for the February, 1940, campaign.

Varied Appeals Used

In analyzing the different appeals used in these campaigns, it must be kept in mind that no brand name of any water heater is used; in fact, not even the illustration of a water heater is used in any of the advertising. Instead, all advertising centers around the hot water faucet emblem, around the idea of automatic hot water service, with basic selling copy that points out the benefits of such service, and illustrations that show uses in the home.

The February 11 — March 6, 1937, campaign, which resulted in 479 sales, was built around the theme of a golden opportunity sale, suggesting the installation of automatic hot water service as a golden investment that is returned many times in comfort, convenience and economy. It was particularly effective because a rise in prices was due, to keep pace with increased costs in all things. The September 9-October 2, 1937, campaign was built around the theme: "Doctors Advise It — Beauty Requires It — Modern Living Demands It — a constant supply of hot water on tap 24 hours a day for every household need." Four hundred thirty-nine sales were made in this campaign.

The February 10 — March 5, 1938, campaign was built around the convenience theme: "Finger-Tip Hot Water Service." Four hundred seventy-one sales resulted. In this and the two preceding campaigns, no cash down payment was required to install any size automatic gas water heater, pay-

ments were as little as $1.50 monthly, paid with the gas bill — the standard four-year terms made available to every cooperating dealer by Houston Natural Gas System through the First Bancredit Corporation plan. As plans were being laid for the fall campaign in 1938, the United States Treasury announced that a new Thomas Jefferson nickel would be released in the fall. As the time drew near, it became evident that the new nickel would not be out until after the campaign, but it was decided to dramatize easy terms with a "Nickel Down — Nickel a Day" offer. The advertisements offered "A nickel down installs . . . as little as a nickel a day will pay for an automatic gas water heater." Four hundred fifty-eight sales were made in this campaign in a system grown to 16,750 meters by this time.

Sales Emblems Hit Hard

In the fall of 1938, Ruud Manufacturing Co. had brought out a portfolio of dealer advertisements in which four hard-hitting sales emblems were used: "all around the house; all around the family; all around the clock; all around the calendar." Since this had not been used by dealers in Houston Natural Gas System, permission was secured from Ruud Manufacturing Co. to use these emblems in the February 9- March 4, 1939, campaign. These were used as eye-catchers at the top of each advertisement, and the campaign slogan adopted was "Your Neighbors Have It — Your Friends Enjoy It—Your Family Wants It — a plentiful supply of hot water on tap every day in the year." As an extra incentive for gas system district managers to put forth every effort on water heater sales, the manager whose district made the best showing against quota was to be sent to the Southern Gas Association convention in March as the gas system delegate, this convention to be held on board ship on a cruise to Havana, Cuba! Five hundred forty-three sales were made for a new gas system high mark in this campaign.

The "Hot Water Harry" emblem was brought out by the Association of Gas Appliance and Equipment Manufacturers in the spring of 1939, and it was decided to incorporate this emblem into the advertising for the September 7-30, 1939, campaign, building entirely new advertisements, since the copy offered in the mat service did not fit into Texas Gulf Coast conditions. The idea of hot water for the whole family was stressed with the slogan: "Automatic Hot Water Service for Mother-Children-Dad." Four hundred twenty-nine sales were made in this campaign.

This brings us down to 1940 and Leap Year, and a "Leap Year 29c Sale" was decided upon as the central theme, with only 29 cents being required to install any size automatic gas water heater, with terms as low as $1.50 monthly. No extra incentive was given gas system managers, yet 543 sales resulted, exactly the same as the previous February, when a cruise to Havana was a bonus for best results. It might be interesting to see just where these 543 sales were made — here is the analysis: 140 replaced old gas heaters of the non-automatic, manually controlled type; 24 replaced competitive fuel; 170 replaced teakettles in the homes of consumers who had been on the gas system's lines for some time but had not installed water heaters; and 209 were installed in newly constructed houses. The latter may appear to be business that would normally come to water heater dealers anyway, but it is interesting to note that nearly all newly constructed houses on the gas system's lines now install automatic gas water heaters, where only about 60% to 70% did this before the campaign activity, year by year, sold prospects on the idea of automatic hot water service.

One of the keys to the success of these seasonal water heater campaigns has been the setting of quotas for each district, based on selling 2% to 2½% of meters, and making each district manager responsible for every known prospect being called on by himself, one of his employes, or by a water heater dealer during the campaign period. Every sale being made by a water heater dealer has naturally resulted in profits for him, and he has given hearty cooperation. Easy budget terms have been a highly important element, with payments made with the gas bill for the purchaser's convenience. Thousands of water heaters have been financed under this plan, and it has been found that when a person installs automatic gas hot water service, he will make the small monthly payments to keep it!

Advertising Mediums Used

Only two advertising mediums have been used in every campaign — local newspaper advertising run by dealers over joint signatures, and direct-mail prepared and mailed to known prospects by the gas system. An interesting sidelight in this respect is that four government postcards, repeating the illustration and headline of the newspaper advertisements with brief offer copy, are more effective than one elaborate color folder, and the past six campaigns have used this postcard method to good advantage.

Truck banners and window streamers were furnished dealers in some of the early campaigns, but difficulties in getting them used properly forced abandonment of this medium. With increased sales in campaigns not using this medium, it has evidently not handicapped the campaigns.

With each campaign resulting in extra sales, it is little wonder that Texas Gulf Coast water heater dealers often ask, "Where do I sign?" when the Houston Natural Gas System sales representative approaches with a new campaign!

TABLE NO. 1. FIVE-YEAR RECORD OF MONTH-BY-MONTH WATER HEATER SALES

Month	*1935*	*1936*	*1937*	*1938*	*1939*	*Total*	*5-Year Average*
January	40	49	68	57	33	247	49
February	37	**325**	**478**	**471**	**517**	1828	366
March	**247***	57	52	50	90	496	99
April	41	46	79	61	89	316	63
May	47	79	104	97	91	418	84
June	44	58	80	75	114	371	74
July	43	59	63	97	63	325	65
August	37	64	40	47	53	241	48
September	25	**381**	**436**	**455**	**448**	1745	349
October	**227**	89	87	111	138	652	130
November	100	97	95	96	156	544	109
December	110	103	123	120	118	574	116
System Total	998	1407	1705	1737	1910	7757	1552

*Bold-faced figures denote campaign months.

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Two All-Gas Homes Built By Pittsburgh Companies

Two "American Way" all-gas homes are being constructed in Highland Village, Stanton Heights, Pittsburgh, by the natural gas companies serving the greater Pittsburgh area and the National Home Builders Bureau. Designs for both homes were adapted from the "Town of Tomorrow" at the New York World's Fair, and feature gas for the four big jobs. One of the houses, expected to be finished early in May, is estimated to sell complete with lot for less than $5500, and the other for somewhat more.

Wisconsin Southern Gas Co's Ignition Dome Heavy Oil Operation at Burlington

• H. J. IDE, Wisconsin Southern Gas Co., Burlington, Wis., in a paper, "The Ignition Dome Heavy Oil Operation at Burlington," presented before the Gas Section of the Wisconsin Utilities Association, Milwaukee, Wis., March 11 and 12, 1940. — (Abstract by G A S.)

THE Wisconsin Southern Gas Co. operates at Burlington, Wis., what may be described as a small water gas-producing plant. The amount of gas manufactured fluctuates with the seasons, varying from 450 to 550 M c. f. of gas per day during the summer months and 300 to 400 M c. f. during the winter months.

The plant has two manually controlled water gas machines equipped with backruns. The larger machine has a 6-ft. generator, 5-ft. carburetor, and 5-ft. superheater, and the smaller standby machine has a 5-ft. generator, 4-ft. carburetor and 4-ft. superheater.

Two years ago an effort was made by the company to find ways and means of reducing gas production costs. Among other things, oil prices and the production of water gas using low gravity oils for enrichment were studied. After an extensive investigation of the heavy oil processes and oil prices, it was decided to convert the carburetor of the 6-ft. gas machine into a "Semet-Solvay Ignition Dome" type to permit the use of a wider variety of enrichment oils and to make it possible to use whatever grade of oil has the lowest current market price, considering gas enrichment value.

Late in the spring of 1939 changes were made in the equipment at the plant to permit the use of heavy oils and to facilitate the handling of the heavier tar emulsions resulting from the use of heavy oil.

Carburetor Changes

The changes made to the carburetor of the 6-ft. machine included the removal of the checker brick and checker supporting arch and the installation of a specially designed refractory dome located below the gas inlet connection from the generator. A hole was made in the side of the carburetor shell about 3 ft. from the floor for the installation of the oil spray. In the superheater the checker brick were removed, and the arch supporting the checker brick was repaired and a second supporting arch was installed about 24 in. above the lower arch. Using two arches we have two separate tiers of checkers, one above the other, and by such an installation the bottom tier of checkers can be replaced without disturbing the upper tier. The teeter valve inside the washbox was removed and replaced with a Semet-Solvay three-way valve which permits the use of a recirculating liquor system for cooling the valve and washing the gas which passes through it. A motor-driven centrifugal pump was installed to draw liquor from the last pass of number two tar separator and to pump the water into the valve sprays. The tar separator water is cooled by circulating it through the 50 M c. f. relief holder tank, and this arrangement helps provide part of the holder heating in the winter.

The flat bottom of the washbox was replaced with a conical bottom. The water and tar leaves the washbox through an overflow pipe. Additional heavy tar is removed at the apex of the cone when a 4-in. drain line is opened. A small inspection port was installed in the top of the washbox and a clean-out door was provided near the bottom of the cone. Steam purge lines were welded into the washbox. These were the only changes made on the water gas machine proper.

Two new steam-driven duplex oil pumps were installed to transfer oil from the oil storage tanks to the oil spray at the machine. These pumps are equipped with a pressure regulating device for controlling the oil pressure in the line to the spray. A secondary oil heater with an automatic temperature control to regulate the oil temperature was installed between the pumps and the spray. The gas oil meter was replaced with a "hot oil" meter and the new oil spray is a water-cooled type which was placed in the lower part of the carburetor to spray the oil upwardly and counter-current to the downward flow of the gas from the generator.

The gas machine was heated up and put into operation on June 15, 1939. The five-minute operating cycle that had been used with the light gas oil operation was retained. Oil pressure was maintained at 140 lbs. per sq. in. at the pump, and oil temperature was controlled at approximately 290° F. The gas manufacturing cycle used was:

Blast—Average	90 sec.
Blow run	15 sec.
Up run	95 sec.
(Oil admission first)	60 sec.
Back run	85 sec.
Final up run	10 sec.
Purge	5 sec.

Using this cycle, we have reformed approximately 20% of the oil gas by introducing a portion of the oil into the carburetor on the backrun. We found that with coal and oil costs last year, the reforming of oil gas gave us a saving in production expense of four mills per M c. f. At the present time we are reducing the amount of reforming and expect to eliminate it entirely unless the ratio of coal to oil costs changes. The oil we are using is of 20-22 degrees API gravity, 4% to 7% conradson carbon and with less than ½ of 1% sulphur. Before converting the machine to heavy oil operation our results using 32/36 degree API gravity 40 degrees cold test UGI gas oil and an eastern bituminous coal were approximately 28 lbs. coal and 2.82 gals. oil per M c. f., maintaining an average heating value of 533 B. t. u. per cu. ft. After the machine was converted to heavy oil operation and properly adjusted, we used 24.2 lbs. of coal and 2.99 gals. of the heavy oil per M c. f. The lower cost of the heavier oil and the decrease in the generator fuel made in overall reduction in the cost of the gas of about 5c per M c. f. The hourly capacity of the machine increased about 15% when using heavy oil and reforming. No smoke trouble or river contamination difficulties were met by changing to heavy oil operation.

Few Difficulties

Operating difficulties encountered with the changeover to heavy oil were few. We have had some carbon deposits in the carburetor, but by opening the bottom clean-out door, we burn up the carbon during the shut-down period. In cases where the burning of the carbon deposits by this method is too slow, a small electric fan is placed in front of the lower door and allowed to blow into the carburetor. The washbox must be drained and cleaned out occasionally for heavy tar and carbon accumulates. The three-way valve must be inspected and cleaned every other day. The time required for this is about 15 minutes. We found it necessary to place a large screen in the discharge from the washbox to the tar separator to catch pieces of carbon and pitch carried out of the washbox. Tar lines have to be blown free occasionally during cold weather when the tar becomes too thick to flow freely at lower temperatures. Steam is used for this job.

Progress on the Pipe Line

THE barometer of progress for the natural gas industry is the story of its ever-expanding transmission lines, for it is through the pipe line that the industry's life blood flows, and the health and growth of the natural gas industry is best indicated by the quickening pulse of the compressor which sends natural gas farther and farther afield to distant cities and industries, where the ultimate consumer — little realizing the foresight, the planning, the physical labor which combines to bring him this invisible but powerful fuel — turns a valve and enjoys instantly the manifold advantages of the little blue flame.

Each year for many years has re-

CITIES AND TOWNS INTRODUCING NATURAL GAS SERVICE (1938-1940)

ARIZONA

El Paso Natural Gas Co.

Town	*Pop.*	*Meters*
Globe	7157	1100
Miami	7693	800
Safford	1706	800
Duncan	1090	75
Pima	980	50
Thatcher	895	100
Solomonville	1283	100

CALIFORNIA

Pacific Gas & Electric Co.

Town	*Pop.*	*Meters*
Livingston	803	132
Atwater	917	187
Lincoln	2094	145
Wheatland	479	41

INDIANA

Michigan Gas Transmission Corp.

Town	*Pop.*	*Meters*
Columbia City	3805	550
Huntington	13,420	3040
Roanoke	849	120
South Whitley	1102	160

IOWA

Northern Natural Gas Co.

Town	*Pop.*	*Meters*
Kingsley	1093	41
Spirit Lake	1778	63
Hartley	1272	68
Le Mars	4788	727
Hawarden	2459	87
Spencer	5019	494
Cherokee	6443	887
Northwood	1554	51
Grand Junction	1025	100
Hamlin	830	15
Joice	225	33
Lake Mills	1474	164
Manly	1447	109
Marcus	1138	67
Milford	1062	57
Paulina	1013	94
Rippey	357	49
Ventura	252	25
Woodward	901	101

KANSAS

Cities Service Gas Co.

Town	*Pop.*	*Meters*
Fall River	339	91

MICHIGAN

Michigan Gas Transmission Corp.

Town	*Pop.*	*Meters*
Ann Arbor	26,944	8145
Chelsea	2071	520
Dexter	894	245

MINNESOTA

Northern Natural Gas Co.

Town	*Pop.*	*Meters*
Fairmont	5521	891
New Ulm	7308	938
Worthington	3878	652
Chaska	1901	50
Cleveland	290	46
Jackson	2206	....
Shakopee	2023	....
Sherburn	860	75
Truman	730	99
Welcome	519	75

NEBRASKA

Kansas Pipe Line & Gas Co.

Town	*Pop.*	*Meters*
Bertrand	645	170
Loomis	213	

Northern Natural Gas Co.

Town	*Pop.*	*Meters*
Ralston	809	125
Papillion	718	95
Manley	184	22
Uhling	297	30

NEW MEXICO

El Paso Natural Gas Co.

Town	*Pop.*	*Meters*
Fort Bayard	509	200
Bayard Station	202	100
Central	2223	100

Southern Union Gas Co.

Town	*Pop.*	*Meters*
Belen	2116	....
Los Lunas	513	....
Isleta	1100	....

OHIO

Michigan Gas Transmission Corp.

Town	*Pop.*	*Meters*
Archbold	1185	225
Bryan	4689	980
Delta	1778	430
Edgerton	989	40
Montpelier	3677	680
Paulding	1904	300
Stryker	817	155
Wauseon	2889	540

OKLAHOMA

Consolidated Gas Utilities Corp.

Town	*Pop.*	*Meters*
Duke	502	66
Olustee	653	76
Sterling	361	36
Apache	1302	217

Oklahoma Natural Gas Co.

Town	*Pop.*	*Meters*
Chandler	2717	....
Sapulpa	10,533	2268
Konowa	2070	475
Marshall	695	150
St. Louis	493	128
Asher	653	91
Lovell	218	31
Sacred Heart	90	18

SOUTH DAKOTA

Northern Natural Gas Co.

Town	*Pop.*	*Meters*
Yankton	6072	125

TEXAS

Lone Star Gas Co.

Town	*Pop.*	*Meters*
Centerville	388	92
Leona	218	16
Normangee	869	88
Madisonville	1294	250

Houston Natural Gas Co.

Town	*Pop.*	*Meters*
Genoa	267	....

Gulf Cities Natural Gas Co.

Town	*Pop.*	*Meters*
Kemah	216	....

Texas Natural Gas Utilities Co.

Town	*Pop.*	*Meters*
Sweeny	510	....
West Columbia	3525	....
Needville	....	....

corded great progress in the industry's expansion, and the present year together with the past two years of 1938 and 1939 have proved to be no exception to this rule. And so it is that *GAS* presents another in its series of natural gas transmission pipe line reviews, compiled from the questionnaires sent to utility and pipe line companies from the Atlantic Seaboard to the Pacific Coast, from the Canadian border to the southernmost tip of the gulf south.

In scanning through the information which is presented in the tables accompanying this article, it is found that major pipe line construction from January, 1938, through March, 1940, was carried on by 27 companies; that 23,509.96 miles of pipe line of varying sizes have been added to the nation's distribution system; that 17,915 hp. were added to compressor station facilities at 22 different locations; that some 82 communities with a total population of 236,325 have turned to gas service, adding over 30,000 meters to the industry's total. And yet, it must not be assumed that the figures quoted above are an absolute total, for such is not the case. Information was not everywhere available, and the tables which form the basis for the above quoted figures were restricted to authentic information as submitted by the companies.

Mid-West Expansion

Major pipe line construction during the two-year period was centered in the mid-continent area. A project of great importance was that of the Northern Natural Gas Co. of Omaha, which constructed a total of some 368 miles of pipe line and increased its compressor station capacity by 1600 hp., in bringing natural gas service to 34 communities in South Dakota, Nebraska, Iowa, and Minnesota. The combined population of these communities adds up to 67,446, while the meters added to the company's lines number 7183. (*GAS*, April, 1940, p. 25). The second major project in this area is that of the Panhandle Eastern Pipe Line Co. of Kansas City. This $3,500,000 project involves the installation of 137 miles of loops along the company's transmission facilities between the Texas and Kansas gas fields and the Illinois-Indiana state line. Much of this project has already been completed (turn to page 38 for a detailed story of Panhandle Eastern's 1940 expansion program).

Supplementing the Panhandle Eastern project is that of the Michigan Gas Transmission Corp., whose lines connect with the Panhandle system at the Illinois-Indiana state line, from that

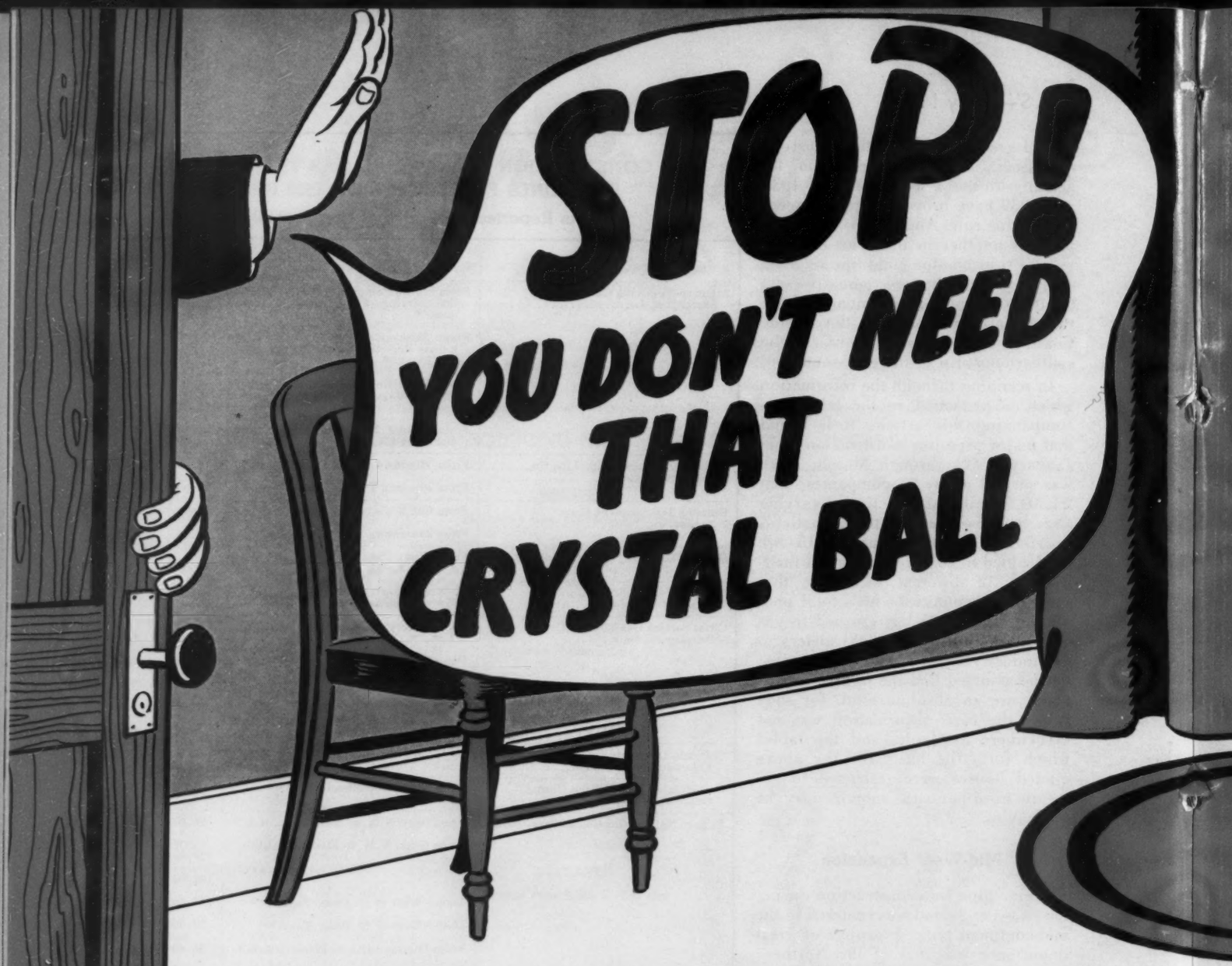
THE CONSTRUCTION OF NATURAL GAS TRANSMISSION PIPE LINES FOR THE PERIOD 1938-1940

(As Reported By Principal Companies)

Company	Location of Line	Length (*Miles*)	Size (*Inches*)
Arkansas-Louisiana Gas Co., Shreveport, La.	From Munce Compressor Station West to line serving El Dorado, Arkansas area.**	6.50	10
	From Shreveport-Monroe Line to Arkansas Fuel Oil Co.'s Bisteneau Gasoline Plant.**	13.40	14
	From Magnolia Pipeline Co. to Schuler Village, Magnolia Fields.*	6.10 2.90 12.80	6 6⅝ 8
	From Schuler Village to Atlanta Area, Columbia Co., Ark.**	1.80 5.30	8 4
American-Michigan Pipe Line Co., Muskegon, Mich.	From Windfield Twp. to Aetna Twp.*	8.00	4½ O.D.
	From Freeman Twp. to Austin Twp.**	30.00	4½ O.D.
Brandon Development Corp., Jamestown, Tenn.	From Gas Wells to Jamestown, Tenn.**	6.00	4
	From Jamestown to Allardt, Tenn.†	5.00	2
Godfrey L. Cabot, Inc. Wellsville, N.Y.	From Ulyses Field to New York-Pennsylvania State Line.**	7.00	4
Central West Utility Co., Kansas City, Mo.	To North Morrisco Field (Near Council Grove, Kansas.)ǂ	....	.....
Cities Service Gas Co., Bartlesville, Okla.	From Reno Co., Kan. to Kingman Co., Kan.**	40.25	8
	From Greenwood Co., Kan.**	11.25	6
	From Rice Co., Kan.*	8.20	6
	From Oklahoma Co., Okla.*	13.00	8
	From Douglas Co., Kan.*	5.33	6
Colorado Interstate Gas Co., Colorado Springs, Colo.	From Clayton, N. M. to Denver, Colo.	....	.....
Consolidated Gas Utilities Corp., Oklahoma City, Okla.	From Wade to Griffin, Okla.*	7.30	6
El Paso Natural Gas Co., El Paso, Texas	From Gage, N.M. to Whitewater, N.M.**	21.00	5
	From Gage, N.M. to Miami, Ariz.**	73.00 120.00 193.00	8⅝ 6⅝
	Loop—West of El Paso, Texas**	56.00	12¾
	Loop—East of El Paso, Texas**	63.00	16
	From Duncan, Ariz. to Morenci, Ariz.†	35.00	6⅝
	From Tombstone, Ariz. to Ft. Huachuca, Ariz.†	24.00	3½
The Kansas Pipe Line & Gas Co. Phillipsburg, Kan.	From Main Line to Bertrand and Loomis, Neb.*	13.00	1½
	From Main Line to Toulon, Kan.*	.....	.....
	From Elm Creek, Neb. to Neb. TB. San. near Kearney, Neb.*	15.00	2
	From Hugoton Panhandle to Mesaba Range.†	.....	.....
Lone Star Gas Co., Dallas, Texas	From Long Lake to Buffalo Field.*	19.00	18
	From Waco to Buffalo Field.**	52.00	8
	From Shamrock to KMA Field.*	10.00	2-6-8
	From Long Lake to Groesbeck Field.**	5.00	6
	From Round Rock to McNeil.**	5.00	4
	From Pernell to Doyle Field.**	10.00	8-10
	From Normangee to Madisonville.‡	12.00	3
	From San Angelo to Carlsbad.**	16.00	6-8
Louisiana-Nevada Transit Co. Dallas, Texas	From Cotton Valley, La. to Okay, Ark.ǂ	78.00	8
	From Fulton, Ark. to Hope, Ark.ǂ	16.00	8-6-4
Memphis Natural Gas Co. Memphis, Tenn.	From Haile, La. to Guthrie, La. Compressor Station.**	15.00	8
Michigan Gas Transmission Corp. Detroit, Mich.	From Dana, Ind. to Montezuma, Ind.**	10.25	24 O.D.
	From Montezuma, Ind. to Hollandsburg, Ind.‡	16.70	24 O.D.

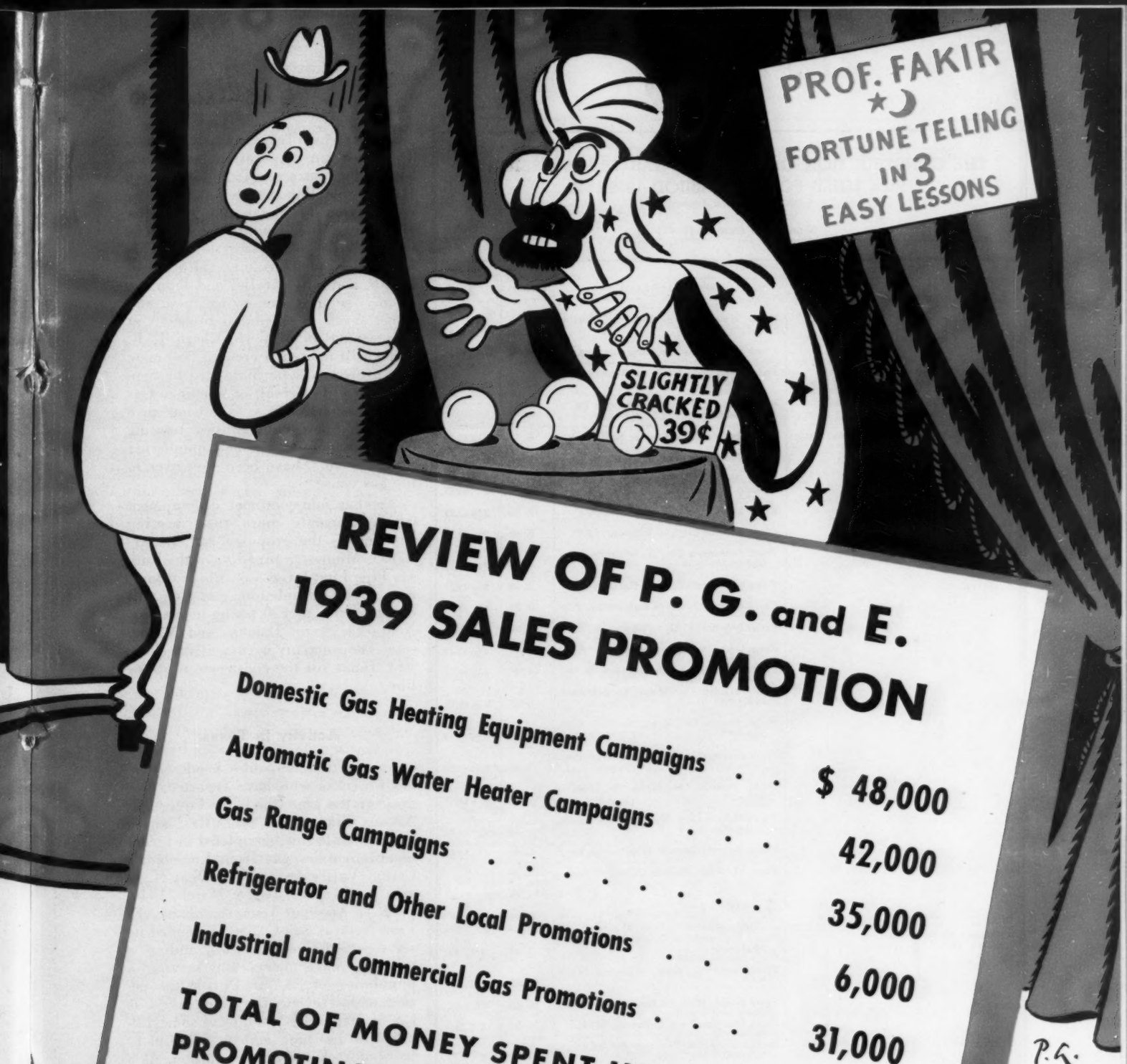
*Constructed in 1938. **Constructed in 1939. †Proposed Construction.
ǂConstructed in 1940. ‡In Progress.

(Continued on Page 50)



YOU CAN TELL WHAT P. G. and E. IS GOING TO DO TO PROMOTE GAS APPLIANCE SALES THIS YEAR — BY WHAT WE DID LAST YEAR

WE'LL SPEND AT LEAST AS MUCH DURING **1940**



REVIEW OF P. G. and E. 1939 SALES PROMOTION

Domestic Gas Heating Equipment Campaigns	$ 48,000
Automatic Gas Water Heater Campaigns	42,000
Gas Range Campaigns	35,000
Refrigerator and Other Local Promotions	6,000
Industrial and Commercial Gas Promotions	31,000
TOTAL OF MONEY SPENT IN PROMOTING GAS APPLIANCE BUSINESS IN 1939	**$162,000**

The above figures include our share of the Gas Association and Gas Appliance Society promotional funds as well as the money spent directly by us in newspapers and other media.

P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY

THE CONSTRUCTION OF NATURAL GAS TRANSMISSION PIPE LINES FOR THE PERIOD 1938-1940

(Continued from Page 47)

Company	Location of Line	Length (*Miles*)	Size (*Inches*)
	From Hollandsburg, Ind. to Morton, Ind.**	5.92	24 O.D.
	From Morton, Ind. to Zionsville, Ind.‡	38.00	24 O.D.
Mountain Fuel Supply Co., Salt Lake City, Utah	From Coalville, Uath to Bigelow Hill, Wyo.*-**	52.70	18
Natural Gas Corp., Nashville, Tenn.	From Gas Field near Shreveport, La. to Chattanooga, Tenn.‡	.....	.....
Northern Natural Gas Co., Omaha, Neb.	From Sarpy Co. to Ralston, Neb.*	6.30	4½ O.D.
	From Vermillion, S.D. to Yankton, S.D.*	25.00	6⅝ O.D.
	From Ventura Compressor Station to Main Line.*	40.70	16 O.D.
	From Main Line to Kensett, Ia.**	12.50	3½ O.D.
	From Dakota City, to Kingsley, Ia.**	5.40	3½ O.D.
	From Dickinson Co., Ia. to Spirit Lake, Ia.**	6.70	3½ O.D.
	From O'Brien Co. la., to Hartley, Ia.**	5.70	3½ O.D.
	From Plymouth Co. to LeMars Ia.**	10.70	4½ O.D.
	From Alcester, S. D. to Hawarden, Ia.**	6.90	4½ O.D.
	From Clay Co., Ia. to Spencer, Ia.**	6.30	4½ O.D.
	From Cherokee Co., to Cherokee, Ia.**	11.00	4½ O.D.
	From Martin Co. Minn. to Fairmont, Minn.**	5.10	4½ O.D.
	From Brown Co. Minn. to New Ulm, Minn.**	24.20	6⅝ O.D.
	From Jackson Co. Minn. to Worthington, Minn.**	19.60	6⅝ O.D.
	From Dakota Co. Minn. to Chaska, Minn.**	17.20	6⅝ O.D.
	From Dakota City, Neb. to Minneapolis, Minn.**	241.20	16 O.D.
	From Kensett, Iowa to Northwood, Ia.**	5.00	2⅜ O.D.
Northern Utilities Co., Casper, Wyo.	From Muskrat Field to Casper, Wyo.*	43.17 20.11 14.38 77.66	14 12 10
Northland Natural Gas Corp. Evart, Mich.	From Mecosta Co., Mich. to Barryton, Mich.*-**	5.43	3 I.D.
	From Barryton, Mich. to Evart, Mich. *-**	14.23	3 I.D.
	From Evart, Mich. to Reed City, Mich.†	14.20	3-6 I.D.
	From Sheridan Twn. to Remus, Mich.†	6.50	3 I.D.
Oklahoma Natural Gas Co., Tulsa, Okla.	Section 15, T13N, R6E near Stroud, Okla. to Section 35, T15N, R6E.*	8.50	6
	Section 12, T5N, R8W, near Cement, Okla. to Section 27, T6N, R10W.*	16.00	12
Pacific Gas & Electric Co. San Francisco, Calif.	From Davis, Calif. to Dixon, Calif.*	8.20	10¾ O.D.
	From Merced, Calif. to Livingston, Calif.*	13.30	8⅝ O.D.
	From Herdlyn, Calif. to Tracy Ternimal.*	3.05 3.80 6.85	8-6⅝ O.D.
	From Buttes Gas Field to Yuba City.*	.60 1.88 11.34 13.82	3½ O.D. 4½ O.D. 6⅝ O.D.
	From Buttes Gas Field to Colusa.*	13.40	3½ O.D.
	From Marysville to Lincoln.**	1.20 23.20 24.40	6⅝ O.D. 8⅝ O.D.

*Constructed in 1938. **Constructed in 1939. †Proposed Construction.
‡Constructed in 1940. ‡In Progress.

(Continued on Page 51)

point carrying Texas gas to Detroit. The Michigan corporation last month awarded a contract to T. R. Jones, Inc., Dallas pipe line contractors, for the construction of a gas line from the Montezuma, Ind., compressor station to the Zionville compressor station. This line will be of 24-in. pipe, 54 miles in length, and will parallel and loop the 20-in. line now connecting these stations. Work is scheduled to begin at Montezuma on May 15, where T. R. Jones will operate a crew of 350 men. The project is to be completed by September 15. As a result of Michigan Gas Transmission Corp.'s expansion program, 15 new communities totaling 67,013 in population, and numbering 16,130 meters, have been won over to the gas cause.

Another mid-continent development which demands more than passing comment is the proposed $21,000,000 Kansas-Minnesota pipe line of the Kansas Pipe Line & Gas Co., Phillipsburg, Kan. Upon completion, this line will bring service to 129 towns in Kansas, Nebraska, South Dakota, and Minnesota. The company is currently seeking RFC funds for the construction of the line.

Activity in Texas

Among the companies headquartering in Texas who have reported progress on the pipe line is the Louisiana-Nevada Transit Co., of Dallas, whose new 100-mile line, completed in recent months, carries gas from Louisiana's Cotton Valley field to the Okay-Hope area in Arkansas. (*GAS*, March, 1940, p. 23). Another Texas company, El Paso Natural Gas Co., has extended its service to 10 communities, adding a total of 3500 meters and serving a population of 23,750. During the period under review, the Lone Star Gas Co. of Dallas has completed some 129 miles of line and added 2550 hp. to its Shamrock compressor station. As a part of this program, the company constructed a 50-mile, 8-in. line from the Buffalo field to Bryan, Texas, bringing service to Centerville, Leona, Normangee, and Madisonville; combined population, 2768; meters added, 446. Still another Texas company to record recent progress was the Southern Union Gas Co. of Dallas, which has completed 159 miles of pipe line and installed 800 hp. at the Bloomfield, N. M., station, in bringing service to three New Mexico communities.

In Oklahoma, the Cities Service Co., Bartlesville; Consolidated Gas Utilities Corp., Oklahoma City; and Oklahoma Natural Gas Co., Tulsa, extended natural gas service to 12 communities, reaching a total population of 18,000

through 3700 new meters. The three companies constructed a total of 110 miles of pipe line, while the Consolidated Gas Utilities Corp. added 4500 hp. to its compressor station facilities.

The United Gas Pipe Line Co., of Shreveport, La., easily earns ranking among the gas companies whose construction activities reached major proportions during the period 1938 up to the present time. In 1938 the company completed 105.3 miles of line, and added 1200 hp. to its compressor station facilities in Wheeler County, Texas; in 1939 over 183 miles of line were added to the company's transmission system, and 1920 hp. was installed at the Jackson compressor station in Rankin County, Miss. The 1939 construction program included the 161-mile line between Monroe, La., and Jackson, Miss. (*GAS*, December, 1939, p. 20; January, 1940, p. 23). The company expects to construct over 55 miles of line during the next few months. Another Louisiana company to make considerable headway in pipe line construction was the Arkansas-Louisiana Gas Co., of Shreveport, which completed some 50 miles in the 1938-1939 period.

In addition to the Michigan Gas Transmission Corp. project mentioned above, two other Michigan companies exhibited strong evidence of natural gas expansion. These are the American-Michigan Pipe Line Co., of Muskegon, which added 38 miles to its system, and the Northland Natural Gas Corp., of Evart, which added 20 miles and has under consideration the construction of another 20 miles.

Illinois and Eastern

In Illinois the Public Service Co. of Northern Illinois through a 23-mile line brought service to the Illinois towns of Pontiac, Cornell, Rowe, and Manville. Still in the formative stage are the plans of the General Gas Pipe Line Corp. of Indianapolis, which has applied to FPC for permission to construct a 130-mile, 20-in. line from central Kentucky to central Indiana.

In the Eastern territory, Godfrey L. Cabot, Inc., of Wellsville, N. Y., completed a seven-mile line and added 3440 hp. to seven compressor stations in 1939.

Several companies in the Northwest portion of the country reported construction activities. These are the Mountain Fuel Supply Co., of Salt Lake City, with 53 miles of pipe line; the Northern Utilities Co., of Casper, Wyo., with 78 miles; and the Rocky Mountain Gas Co., of Casper, Wyo., with 17 miles. Colorado Interstate Gas Co., Colorado Springs, Colo., added

THE CONSTRUCTION OF NATURAL GAS TRANSMISSION PIPE LINES FOR THE PERIOD 1938-1940

(Continued from Page 50)

Company	Location of Line	Length (*Miles*)	Size (*Inches*)
	From Trico Gas Field to Collecting System.**	3.70	4½ O.D.
		3.30	6⅝ O.D.
		13.60	8 O.D.
		20.60	
	From East Rio Vista Gas Field to Sacramento-Stockton Line.†	1.90	6⅝ O.D.
		16.50	12¾ O.D.
		18.40	
Panhandle Eastern Pipe Line Co., Kansas City, Mo.	From Liberal, Kan. to Main Line.ǂ	15.48	24 O.D.
	Loop—Greensburg, Kan.ǂ	23.17	24 O.D.
	Loop—Haven, Kan.ǂ	16.59	24 O.D.
	Loop—Olpe, Kan.†	15.50	24 O.D.
	Loop—Louisburg, Mo.ǂ	8.25	24 O.D.
	Loop—Houstonia, Mo.ǂ	3.89	18 O.D.
	Loop—Houstonia, Mo.ǂ	8.04	22 O.D.
	Loop—Centralia, Mo.‡	18.00	22 O.D.
	Loop—Pleasant Hill, Ill.†	10.72	22 O.D.
	Loop—Glen Arm Loop, Ill.†	17.08	22 O.D.
Republic Natural Gas Co., Dallas, Texas..	From Field Lines to Hugoton Field, Kan. and Okla.**	11.00	10
	Field Lines.**	10.00	8
	Field Lines.**	12.00	6
	From Field Lines in Saxet and White Point to Refugio Field.*-**	6.00	4
		6.00	6
		6.00	4
		6.00	4
		24.00	
Rocky Mountain Gas Co., Casper, Wyo...	From Bunker Hill Field to Mahoney Dome Field.**	11.96	6
	From Oil Springs Field to Allen Lake Field.**	5.29	6
Southern California Gas Co., Los Angeles, Calif.	From Kettleman Hills to Lemoore Jct.*	4.45	10
	From Kettleman Hills to Lemoore Jct.**	4.85	10
		4.80	8
		9.65	
	From Lemoore Jct. to Visalia.	.....	...
Southern Union Gas Co., Dallas, Texas..	From Tom Ball Gas Field to Prairie View, Texas.*	31.00	6
	From Potash Co. to Loving, N.M.ǂ	9.00	6
		13.00	4
		22.00	
	From Albuquerque to Belen, N.M.ǂ	31.00	5
	From Bloomfield, N.M. (Loop)†	16.00	8-6
Texas Natural Gas Utilities, Houston, Texas	From Ocean Field to West Columbia.	9.00	4
United Gas Pipe Line Co., Shreveport, La.	From Webster Compressor Station to Springhill, La.*	6.50	12
	From Transmission System to Wichita Co., Texas.*	13.00	6
		21.00	4
		34.00	
	From Graham Main Line to Archer Co., Texas.**	6.30	2
	From Liberty Oil Field to Martha Field, Texas.**	5.40	4
	From Katy and North Houston Field to Goodrich-Houston Main Line.*	14.60	16
		11.50	12
		18.60	10
		3.00	8
		47.70	
	From South Jennings Field to Franklin Main Line.*	7.10	6

*Constructed in 1938. **Constructed in 1939. †Proposed Construction.
ǂConstructed in 1940. ‡In Progress.

(Continued on Page 52)

THE CONSTRUCTION OF NATURAL GAS TRANSMISSION PIPE LINES FOR THE PERIOD 1938-1940

(Continued from Page 51)

COMPANY	LOCATION OF LINE	LENGTH (*Miles*)	SIZE (*Inches*)
United Gas Pipe Line Co., Shreveport, La.	From Monroe, La. to Jackson, Miss.**	124.70	18
	From Sterlington Compressor Station to Perryville, La.**	5.00	16
	From Koran Gas Plant to Monroe Transmission Line.**	17.80	20
	From Koran Gasoline Plant to Sligo Field.**	7.50	14
	From Sibley Field to Arkansas-Louisiana Pipe Line Co.**	1.80	4
	From Bistineau Field to Arkansas- Louisiana Pipe Line Co.**	4.50	8
	From Sligo Field to Koran Gas Plant.†	7.40	8
	From Lirette Field to New Orleans, La.†	47.50	12
	From Orchard Field to Rosenberg, Tex.*	10.00	8
	From Houston Lighting & Power Co. to Shell Refinery.**	5.00	10
	From Katy Field Main Line to Yale St. Town Border Station.**	5.00	8

*Constructed in 1938. **Constructed in 1939. †Proposed Construction.

600 hp. to its 3000-hp. Canyon compressor station on the line from Clayton, N. M., to Denver. As to future developments in this territory, *GAS* reported (in March, 1940, p. 27) the activities of a Salt Lake City syndicate, which plans a $7,500,000 expenditure for the development of gas wells and the construction of a pipe line through Idaho, Utah, Oregon, and Washington. Further indication of expansion in this territory was indicated by the recent incorporation of the Spokane (Wash.) Pipe Line Co., which has formed tentative plans for the construction of a 300-mile line between Montana and Spokane.

In the South the Memphis Natural Gas Co., Memphis, Tenn., added 15 miles of 8-in. gathering line and installed 2140 hp. at its Guthrie (La.) and Lula (Miss.) compressor plants. In this territory also, the Southern Natural Gas Co. of Birmingham increased its service to Yazoo City, Miss., with the construction of a 32-mile line. In Tennessee the newly-formed Tennessee Gas & Transmission Corp., headed by Curtis Dall, New York investor, is seeking to bring natural gas from Louisiana fields to serve Chattanooga, Nashville, Knoxville, and 31 other Tennessee cities and towns.

On the Pacific Coast the Pacific Gas & Electric Co. of San Francisco has, with the recent discovery of new natural gas resources in northern California (*GAS*, August, 1938, p. 54), embarked upon a construction program which extended its service to four towns with a total population of 4293 and 505 meters. Most recent development has been the granting of an easement to the P. G. & E. for the laying of gathering lines from the Rio Vista field to the company's transmission line. The company is at present making extensive plans to transmit Rio Vista gas to bolster the supply to its North Bay area, comprising Marin, Sonoma, Yolo, and parts of Solano Counties. In the Los Angeles area, the Southern California Gas Co. in the past two years has extended service to Ivanhoe and Woodlake near Visalia and to consumers in the Lake Arrowhead Resort district near San Bernardino.

With the above resumé and with the accompanying tables, *GAS* has attempted to epitomize the recent natural gas pipe line construction in the United States. All indications seem to point to even greater activities in the future, especially in the Mid-Continent and Northwest territories.

■ ■

Windom, Minn., to Be Served By Minnesota Natural

Surveys have been made recently in Windom, Minn., by the Minnesota Natural Gas Co., for the construction of a distribution system in that city. The gas will be brought to the city through a pipe line soon to be built from south of Lakefield to Windom. Plans for construction of the line and distribution system follow the granting of a 10-year natural gas franchise by the citizens of Windom to the Minnesota Natural Co.

United Gas Corp. Sponsors Better Living Drive

A DRIVE to stimulate gas appliance sales was opened in March by the United Gas Corp., Houston, Texas, under the title, "Better Living Activities." The campaign, similar to the Better Living Activities originally tested last year, will continue through May and June in communities throughout Mississippi, Texas and Louisiana.

Each Better Living Activity is opened by a cooking demonstration, sponsored by some local women's organization and conducted by one of the company's home service advisors, assisted by local dealers who furnish the gas appliances used in the demonstration. Following the cooking school, sales representatives call on every customer in the community and explain how modern gas appliances can give everyone better living.

To assist in the extended program, five new home service advisors and 14 new residential outside salesmen were added to the staff of the United Gas Corp. following a two-weeks sales training school. The new home service girls are Sally Bean, Jean Buchanan, Gayle Smith, Bessie Smith, Leva Griffitts, Louise Hamilton and Beulah Pearl.

Another drive sponsored by United Gas Corp. to stimulate greater use of gas services was launched last month with the mailing of two colorful messages to 1604 auto service stations and 2327 cafes, drug stores, and lunch counters. The folder sent to service stations was captioned, "Make Them Roll Into Your Place," and suggested gas for water heating, for a water still for battery service, and a laundry stove for radiator repair service. The folder for restaurants promoted the sale of automatic toasters, deep fat fryers and griddles.

■ ■

Gas Service Co. Conducts Appliance Sales Drive

A gas appliance sales campaign, called the "Door Bell Pushers' Contest," is being sponsored by the new business department of the Gas Service Co., Kansas City, Mo. The drive began in March and will end the last of June, a different gas appliance being featured each month. Prizes are to be awarded to the salesmen earning the most points, and in addition there is a weekly prize given the territory representative securing the greatest number of points on equipment installed. During the first week of the contest, 173 water heaters and 178 gas ranges were sold.

■ ■

Dates Set For Power Show

The Fourteenth National Exposition of Power and Mechanical Engineering has recently been announced for December 2 to 7, 1940, at Grand Central Palace, New York. Better known as the National Power Show, this biennial exposition brings together the product displays of over 300 leading manufacturers serving the power field, and is widely attended by power engineers, operating men and executives.

■ ■

Retired Gas Official Dies

William Buffington Nichols, retired vice president and director of the Boston Consolidated Gas Co., died recently at the age of 74. Before his association with Boston Consolidated, he was president, in 1923, of the Citizens Gas Light Co., Quincy, Mass. This company has since been merged with the Boston Consolidated Gas Co.

. . . Air Conditioning

The United Gas Building

By A. B. BANOWSKY

Commercial Sales Manager, United Gas Corporation

ONE of the latest buildings in downtown Houston to be air conditioned has these two distinct features:

1. Heating boilers will be running at a heavier load in mid-summer than they have in the past in mid-winter.

2. The high moisture content of the Gulf Coast air will be removed by a method other than the commonly used one of cooling the air below the dew point and condensing out the moisture.

This building is the United Gas Building located at Texas and San Jacinto Streets and occupied in December of 1939 by the United Gas Corp. and companies associated with it in supplying gas. The building itself is a 10-story reinforced concrete structure originally built in 1923.

The offices in the building include the downtown offices of the Houston Division of United Gas Corp. which serves at retail a major portion of the gas users in Houston. The offices include all of the general offices of the Operating Division of United Gas Corp. which supervise retail operations in 175 towns in Texas, Louisiana and Mississippi. Also included are the Houston District offices of United Gas Pipe Line Co., Houston Gulf Gas Co. and part of the Houston District offices of Union Producing Co. Certain other tenants are located on three floors of the building. Seven floors of the building are air conditioned at present. Provisions have been made for future air conditioning of the entire building.

FIG. 1. The United Gas Building, Houston, Texas, which has seven floors air conditioned by gas. All outside air for ventilation is dried, properly mixed with clean recirculated air, cooled to the desired temperature, and then delivered to the areas to be conditioned. Cooling is accomplished by five units.

The entire building, as shown in Fig. 1, has 64,820 sq. ft. of rentable floor area, of which 43,630 sq. ft. are air conditioned. The building has 714,900 cu. ft. of volume in the rentable space, of which 498,400 cu. ft. of volume is in the air conditioned space. The total sensible load on the portion now air conditioned is 1,898,460 B.t.u. per hour. The latent load is 697,600 B.t.u. per hour, making a total of 2,596,060 B.t.u. per hour required. Of this amount 695,600 B.t.u. per hour is required for cooling the fresh air supply.

At the time the remodeling of this building was being planned by the architect, J. W. Dehnert, the United Gas Corp. was maintaining in the Engineering and Sales departments engineers capable of assisting customers in planning gas air conditioning installations. This force was busily engaged in preparing proposals and making actual installations for customers. To have diverted an appreciable part of their energies to the air conditioning of this office building would have been to handicap the sales work then in progress. For this reason A. E. Vroome of Ebasco Services, Inc., New York, was designated as consulting engineer. Mr. Vroome had the advantage of having made extensive economic studies on various types of gas air conditioning in connection with his work on the United Gas Pipe Line Building in Shreveport, La.

Two problems presented themselves in selecting equipment to be used. The first problem was whether to use the present boilers in the building which were two 53-hp. Erie City boilers for 15 lbs. working pressure which were 17 years old and originally designed for coal firing; or to purchase new steam generating or heat producing equipment. Another problem was whether to use chilled water coils for removing moisture from the air or to use some means of drying of outside air. This last problem was not determined until alternate bids had been taken providing for the use of 48° water and condensing out the moisture, or the use of dehumidifying equipment and 55° water. After actual installation cost figures had been obtained it was possible to make an economic determination that the dehumidifying equipment was the most logical arrangement.

• IF A GAS UTILITY is to sell air conditioning, it must first demonstrate to its customers what air conditioning is and what it will do. A means of doing this that has been adopted by many companies is to install air conditioning equipment in company offices, where both employe and customer may become aware of the benefits of this gas service. Probably the most recent installation of this type is that described on these pages by Mr. Banowsky. The project was completed last month, and delegates to the Natural Gas Section Convention in Houston this month will have the opportunity of inspecting this installation at first hand. — Editor.

The system that was installed is made up of four fan rooms, each of which circulates air to various zones of the building, with sensible cooling being provided from a central refrigerating plant on the second floor, and the drying of air being done by introducing dry outside air from the dehumidifier to be mixed with recirculated air.

The building itself is rectangular in shape, with one long side on San Jacinto Street; one short side fronts on Texas Avenue and the other long side above the second floor is exposed to a court area; the remaining short side adjoins another building. The fan room on the tenth floor which takes care of the ninth floor has a San Jacinto Street zone, a Texas Avenue zone and a court zone. The fan room on the eighth floor which takes care of the seventh and eighth floors has the same

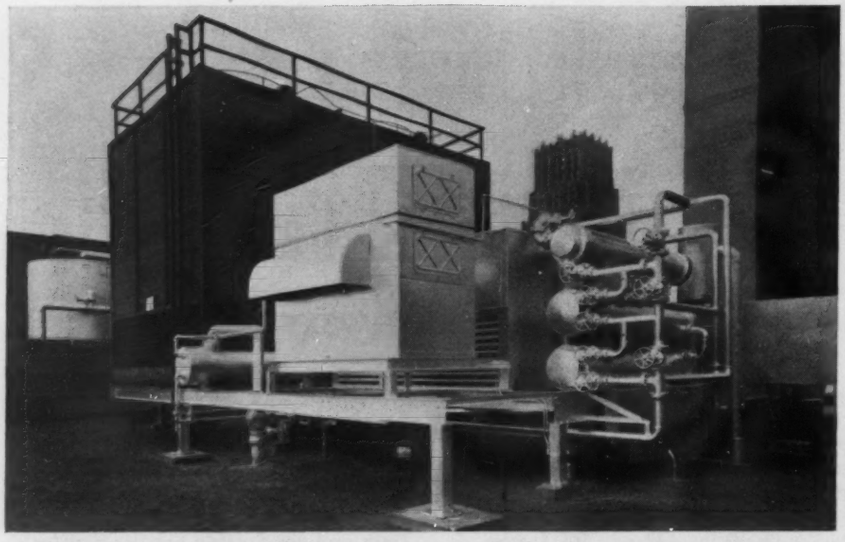


FIG. 2. A Kathabar dehumidifier located on the roof beside the atmospheric cooling tower provides the 50 tons of cooling required in removing moisture from the air which enters the United Gas Building. Five units supply 142 tons for cooling the building.

three zones as does the fan room on the sixth floor which takes care of the fifth floor. On the second floor there is a fan room which has three zone fans for the second and third floors similar to those of the upper floors. In addition, there is another zone fan which provides air for the main sales floor and the fifth zone in this fan room which provides air for a mezzanine and the space beneath which is behind the sales space on the first floor.

Dehumidification Unit

The dehumidifying equipment is Kathabar equipment as manufactured by the Surface Combustion Corp. and is located on the roof of the building. This is shown in Fig. 2. This equipment is designed for future capacity of 25,000 c.f.m. and at present it is handling only 19,000 c.f.m. It is designed to dry outside air at 95° F. dry bulb and 78° wet bulb, containing 118 grains of moisture to 68 grains of moisture. The dry bulb temperature coming from the dehumidifier will be 107° F. This is passed through a cooling coil served by water from the cooling tower also located on the roof, and the dry air will be delivered to the fan rooms at 93° F. to 94° F. in temperature. The Kathabar unit operates by passing the air over contactor plates which are covered with a concentrated solution of lithium chloride. In the concentrated stage this has the property of absorbing moisture which dries the air. The moisture-laden lithium chloride then passes to a concentrator where it is heated by steam from the building boilers and when air is circulated over it at its higher temperature the solution gives up its moisture and becomes concentrated again for re-use.

Chilled water is produced in a central location on the second floor by five Williams Air-O-Matic Absorption units. These units also are supplied with steam from the original building boilers in the basement. The water chillers of three units are connected together to serve the first three floors, while the water chillers of the two additional units are connected together to serve the upper floors. Due to the fact that no moisture is condensed out in the cooling coils chilled water temperature is only 55°. This could easily have been 48° and all dehumidifying done by condensation except that the saving in refrigerating equipment so required was more than the cost of the Kathabar equipment.

The original steam boilers in the basement have been equipped with new burners with a maximum capacity of 8000 cu. ft. per hour for the two boilers. Boiler controls include steam pressure control of the gas supply as well as a combination low water shut-off and automatic boiler water feeder, and automatic pilot.

The control of the system is maintained by one thermostat in each zone, of which there are a total of 14 in the building. When the thermostat is satisfied a Johnson service valve closes the water valve to the zone cooling coils and the face and by-pass dampers are modulated. When enough coils have been shut off to affect the load on the Williams units so that they begin to lower the temperature of the chilled water, there is a step control which cuts out units on a half degree range; that is, when the water temperature reaches a certain point on the three units for the first three floors, one unit will cut out. If the temperature goes down further, the second unit will cut out. If it declines further, the third unit will cut out. Since the steam requirements for cooling are directly proportionate to the refrigerant being handled by the Williams machines this shut-down of the Williams units will cause the steam pressure to increase to a point where the gas is shut off in the basement.

The Cooling Process

An induced draft tower (see Fig. 2) is located on the roof having a capacity of 1410 gals. per minute and designed for 100° entering water and 86° water at the outlet, with an ambient air temperature of 78° F. wet bulb. Water is handled by two condensing water pumps.

The total electric load on this system can be summarized as follows:

1. Fourteen air-handling fan motors handling a total of 77,900 c.f.m. of air, requiring a total of 28 hp. connected load.

2. All toilets in the air conditioned area have been provided with exhaust fans to the outside, which have a total of 2.08 connected hp.

3. Two chilled water pumps are used for circulating chilled water to the various fan rooms. These two pump motors total 27.5 hp. of connected load.

4. The motors required for condensing water pumps and tower fans are two water pumps of 20 hp. each and two tower fans of 15 hp. each, totaling 70 hp.

5. Chilled water is produced by five Williams units, each of which has a 1.5 hp. solution pump or a total of 7.5 connected hp.

6. Kathabar dehumidifier requires motors as follows:

Main fresh air blower	10.0 hp.
Water cooling pump	5.0 hp.
Kathabar solution pump	10.0 hp.
Fan on concentrator	1.5 hp.
Total	26.5 hp.

It can be seen from the above that the total connected horsepower is slightly over 161, of which the horsepower required for refrigerating units proper is 34 hp. The maximum gas input has been designed for 8000 cu. ft. per hour. The total tonnage as actually installed from all sources is 192.

Specifications on this job were drawn and contract was let to a regular air conditioning firm on the basis that if supplied with 55° water and air

of certain dryness they would guarantee performance of an average temperature not exceeding 80° F. dry bulb and a relative humidity of 50% when outdoor air was a maximum of 95° F. dry bulb and 78° wet bulb. In the original contract an allowance was made for installation of the Williams equipment and the Kathabar equipment. This work was subsequently contracted to the same contracting company which then made the whole building installation.

Heating for the first three floors is done by the same zone fans which handle cooling. This is accomplished by installing in the chilled water lines a Whitlock heater supplied by steam from the boilers in the basement. The same coils which handle chilled water in the summer carry warm water in the winter. All floors above the third floor are heated by the original steam radiators in the building.

The main control board has been set up in the second floor equipment room from which all equipment may be controlled. There are also provided recording flow meters and temperature recorders on the chilled water lines so that the amount and temperature of chilled water being circulated may be determined for any period. In this manner the load imposed on the Williams units may be determined accurately for any period.

■ ■

Special Rate Allowed for Memphis Industrial Plant

A special wholesale rate of 12 cents per M c.f. for gas sold to the Firestone Tire and Rubber Co.'s Memphis, Tenn., plant has recently been allowed the City of Memphis and the Memphis Natural Gas Co. by the Federal Power Commission. The new rate takes effect as of November 23, 1939, which is the date the old rate of 11 cents per M c.f. for the Firestone plant expired.

The Firestone Co., largest industry in Memphis, uses approximately 870,000,000 cu. ft. of natural gas per year. The gas has been produced by the United Gas Pipe Line Co. for the Memphis Natural Gas Co., which in turn sold the gas to the city's Gas Light and Water Division for distribution to the Firestone plant.

■ ■

Ames to Have Natural Gas

Changeover from manufactured to natural gas will take place in Ames, Iowa, the latter part of June, it has been reported by Charles Merrick, division manager of the Iowa Electric Light and Power Co., distributors of the gas. To handle the changeover, the company plans to equip each gas appliance with an adapter prior to the change.

■ ■

Columbia Employe Dies

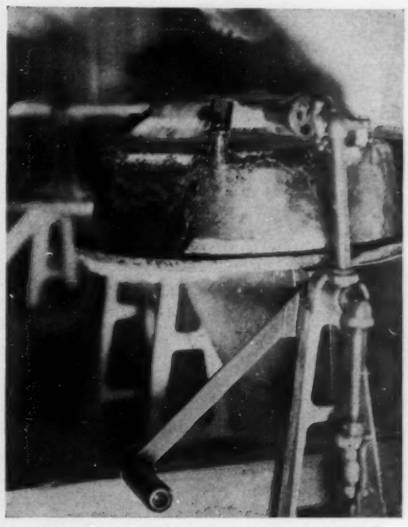
Homer L. Bennett, manager of the Wheeling, W. Va., district of the Pittsburgh Group of Columbia System Utilities, died March 23. Mr. Bennett was associated with the Columbia System and a number of its predecessor companies for 35 years.

A Design of Gas-Fired Corn Popper

IN the past several years* the business of corn popping has assumed large proportions, and popcorn appears to have achieved a permanent place in the food industry. The tin containers are a familiar sight in groceries and delicatessen stores.

The number of corn popping plants is rapidly increasing and in consequence the business has become highly competitive. The plant with the lowest costs of production either has an advantage in price or has a higher profit. For this and other reasons gas is supplanting electricity in this field. Gas operation very definitely reduces production costs and with gas the temperatures can be adjusted more accurately to take care of variations in the different grades of corn.

The single unit, as pictured in Fig. 1, is an aluminum container with gas burner rigidly attached to the bottom. Gas is supplied through a swivel joint in one of the support brackets so that the unit may be dumped without affecting the gas flame. A stirring device is operated through the other support bracket. A one-quarter horse-power motor operating through a gear box is capable of operating three of these poppers in tandem and one person can tend the filling and dumping of the three units.



A gas-fired corn popper.

The popped corn is dumped into a revolving screen cylinder and the "grandmas" and unpopped corn are sorted out. The remaining product is canned, weighed, and sealed, ready for delivery.

Each popper is capable of popping 50 lbs. of corn per hour and the gas consumption is 50 cu. ft. of 1100 B.t.u. gas per hour, leading to an average production of 1000 lbs. of corn per M c.f.

*Excerpts from Gas Utilization Data Bulletin No. 56 prepared for the Pacific Coast Gas Association by Otto Ketelson, Jr., San Diego Consolidated Gas & Electric Co.

A Gas Fired Boiler Joins the Army

ONE problem* which confronts the works or factory manager in connection with his air raid precaution measures is the provision of means for the safe and speedy decontamination of articles of clothing which have been subjected to war-time gases.

To meet this need, a gas heated wash boiler has been introduced by Radiation Limited which has been specially designed to conform with all the standards put forward by the government and local A.R.P. authorities.

In two sizes, namely 30- and 40-gal. iron construction, only materials capable of withstanding hard and continual capacity, this boiler is of rigid cast wear having been used, so that it will be able to cope with heavy duties and remain in serviceable condition for an indefinite period.

Complete decontamination of all garments is provided for by the inclusion of a special grid fitted to the inside of the lid to ensure that the clothes are totally submerged.

The boiler is absolutely steamproof when in use, all the joints being made with heavy section rubber and the lid, which is hinged and weighted, being kept perfectly steam tight by two handlocking wheels. All the fumes and steam arising from the washing, moreover, automatically pass direct through the flue and can be conducted to a safe outlet in the open air.

Apart from its use as an A. R. P. boiler, this appliance can be used continually for supplying boiling water for floor cleaning, yard washing, and similar purposes; provision is made, too, for alternative or supplementary heating from low pressure steam supply when such is available. Different types of counterbalance gear for the lid are available to suit local conditions.

*Reprinted from the London *Gas Times*.

Hey there! Is Sumpthin' Missin'?

THERE CERTAINLY IS "sumpthin' missin' " if you don't *get in on the ground floor* by giving floor furnaces a major place in your merchandising program. And that something is missing right where it hurts most . . . in your load, in your revenue, in your satisfied customers.

If you will check, you may be surprised at the number of places on your lines where you can *"get in on the ground floor"* with floor furnaces.

How many homes have you that are now ineffectively and uncertainly heated by portable space heaters? A floor furnace will give those owners *permanent* satisfaction and will give you *permanent* profit. Because a floor furnace will do a fine job of persuading the consumer that gas is the *clean, efficient fuel* you know it to be.

How many homes are there that are not big enough or whose owners are not well-to-do enough to install a unit heating plant? A floor furnace overcomes this first cost problem . . . gets you in on the ground floor . . . and prepares the way for additional installations that will heat the entire house.

You'll find lots of homes without basements or with other installation difficulties that are easily overcome by a floor furnace, which can simply be dropped into a floor opening, hooked up to vent and gas lines . . . ready to go to work.

Yes, sir, if you'll bother to check you are bound to agree that floor furnaces offer the only practical way to do a permanent heating job in many homes you are now inadequately or unprofitably serving.

It isn't only floor furnace manufacturers like the Ward Heater Company who are arguing the case for this type of appliance. Outstanding merchandising executives in your own business are speaking with forceful eloquence on the subject.

Here's what one of them said in a recent speech:

"The great improvements made by the appliance manufacturers in their products are having a very material effect upon the progress and upon the ultimate gas sales revenues . . .

"There is much pioneering work to be done —we need to take our customers out of the "space heater huddle" and sell them automatic, controlled heating equipment. *Many gas customers do not even know what a floor furnace is!*

"We now need to turn our attention to doing a *permanent* job of selling our customers on the *comfort and convenience of floor furnaces.*"

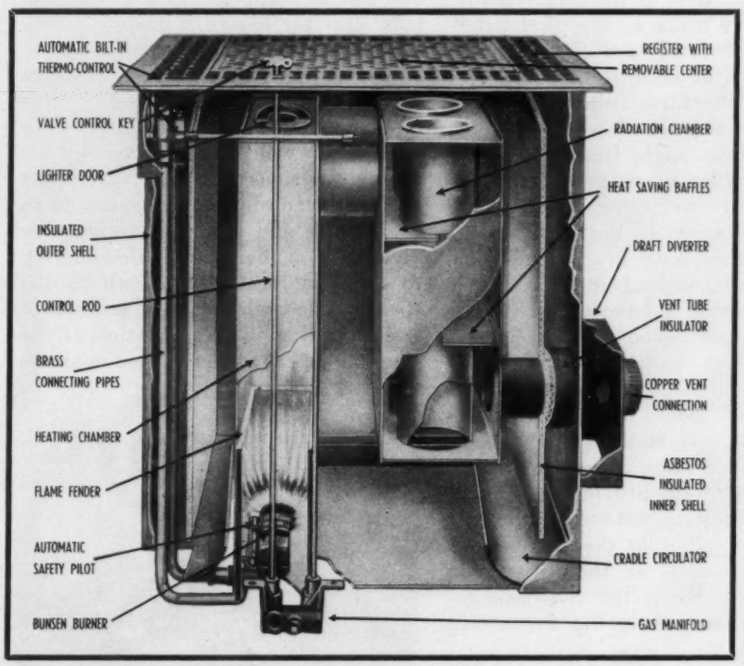
• • •

If there is a gap in your merchandising program . . . an "aching void" between major plants and far less permanent appliances . . . now is a good time to start thinking about filling it successfully with dependable, efficient, vented floor furnaces which are *permanent* and *stay put.*

Possibly the reason many of your customers don't know about floor furnaces is because you haven't seriously considered what a floor furnace can do for them . . . and for you.

A careful study of our 1940 catalog will help fix that. Why not write us today?

Horace J. Smith
PRESIDENT



☆ *May we send you a copy of our latest catalog with price lists and complete information about our furnaces*

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LOS ANGELES

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with
WARD
Floor Furnaces

31 YEARS . . . 62 MODELS

On your lines are plenty of places where you are losing permanent space heating profits if you do not sell floor furnaces. Conquer these "fresh fields" with WARD FLOOR FURNACES. For 31 years WARDS have grown in importance in the merchandising of many utilities. Today we make floor furnaces *exclusively* . . . 62 models adaptable to a wide variety of heating requirements. WARD FLOOR FURNACES are *ten-year-guaranteed* appliances with a proven record of service. They will please your customers . . . and profit your company.

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H. C. SANDERSON
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Pittsburgh, Pennsylvania

L. E. KIRKPATRICK
1700 15th Street
Denver, Colorado

LEON M. TAYLOR
3200 Main Street
Dallas, Texas

Protecting Pipe Lines with CONCRETE

• **EXPERIENCES WITH concrete as a protection for buried pipe lines have been varied, some satisfactory, some disappointing. In those instances where this type of pipe line protection has proved unsatisfactory, the results can probably be traced in many cases to improper application and installation in the ditch. It appears particularly essential to prepare a carefully mixed concrete, to apply it in uniform and adequate thickness, to provide for proper curing, and to lower the coated pipe carefully so that cracking will not take place. The present article describes a method of coating, using removable forms, which would appear to fulfill these requirements. — Editor.**

THE types of corrosive soil encountered in the Allegheny Mountain country of Pennsylvania, West Virginia, New York State and Ohio run from acidic to strongly alkaline, and many spots are highly impregnated with sulphurous waters. Salt water from oil field operation has been permitted to flow unrestricted into runs, creeks and rivers for many years, much of which has remained in the soil, and many of the swampy regions traversed by pipe lines are saturated with brines. Also, sulphur water from shale outcrops constantly finds its way to the surface and upon leaching forms weak sulphuric acid which rapidly pits adjacent pipe lines.

To combat such pipe line deterioration, experiments were made with a concrete sheath for the pipe lines, applied in a crude manner by placing a wood trough as a form to pour the mixture. Subsequent inspection of this protection indicated that, if the concrete had been properly placed around the pipe line, adequate protection could have been obtained. The dampness of the soil, however, quickly caused the wood forms to decay and become soft and spongy. The weight of the pipe bearing on the rotting wood caused uneven tension which cracked the concrete cover.

About seven years ago, the National Transit Co. began to experiment with steel forms which could be removed from the pipe lines soon after the mixture hardened. The original metal forms were heavy, cumbersome to handle and frequently caused checking of the concrete as they were stripped from the pipe lines. About two years later, a decided improvement was made in the forms, which overcomes all the objectionable features of the previous attempts at fabricating steel concreting pipe line forms.

The present forms are shop made from light weight galvanized iron sheets, shaped similarly to ordinary roof gutters, with reinforced rolled rims on both sides. Heavy wire rods are placed in the rolled rims which are cut off about 2 in. from either end and the roll flattened. The forms are made in both 4- and 8-ft. lengths and are uniform in size and shape and interchangeable one with another. The diameters of the forms vary with the size of the pipe being covered, but are designed to provide not less than 1 in. of concrete for the covering.

As an end view of the forms shows that they are made as a capital letter "U," it is obviously necessary to provide a brace or fastener of some sort to prevent the form from bulging at the sides when filled with concrete. Common 1-in. angle iron is used in proper lengths to extend from one rolled rim to the other for spacing, which is attached to the sides of the forms with ordinary strap hinges, one side of each hinge being riveted to the angle iron, and the other half to the form itself. The hinge pins are smoothed with sandpaper so that they will slip into any pair of hinges. Braces and their companion half-hinges are used at the ends of each 4- and 8-ft. section only, and heavy wire supports are provided for other portions requiring stiffening. The wire is bent somewhat in the shape of a screen door hook so that it can be pressed over the rolled rims and remain in place while the forms are being used.

To space the braces the required distance from the top of the pipe line, lugs are welded in the angle of the braces at the mean center. These lugs are cut with serrated teeth which form the contact with the pipe. The contour of the teeth are such that the braces may be removed from the forms after the concrete has hardened without breaking the concrete or chipping it away from the pipe. These braces and spacing lugs are shown in Fig. 1.

To obtain the desired space between the trough of the forms and the lower side of the pipe line, special supports have been designed which support both the pipe and the forms from the bottom of the pipe line ditch. These supports are made in uniform size and shape to provide complete interchangeability. A flat piece of tank steel is used (about 6 in. wide and 8 in. long for 6-in. pipe), to which are welded two vertical pieces. These side pieces are cut at the top to take a curved section or saddle of pipe which conforms to the contour of the forms. Tapered lugs are welded in the trough of the saddles, and protrude upward through holes cut in the forms so as to support the pipe. These lugs are tapered especially so that they may be removed after the concrete has hardened to prevent chipping or breaking. At places in the pipe line ditch which are soft and spongy, larger slabs of tank steel are placed beneath the supports to prevent misalignment due to sinking in the ground. Fig. 2 shows this method of support.

As concrete is usually applied to pipe lines which have been in the ground for some time, the "hot" spots are excavated and the line brought to the surface and placed on skids. The crew chip off the rough scale adhering to the pipe and clean down to the tough oxide scale near the surface of the pipe. If, upon examination of the line, the extent of the corrosion shows

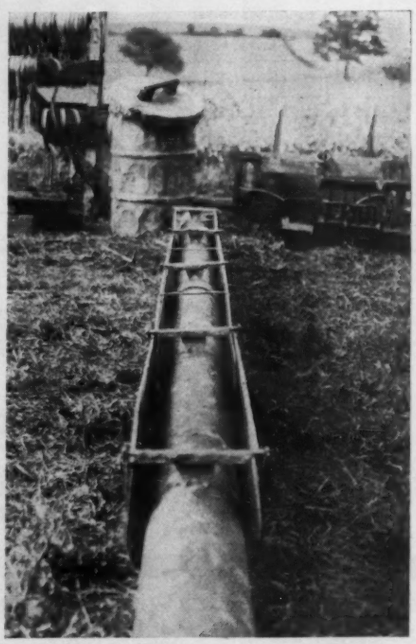
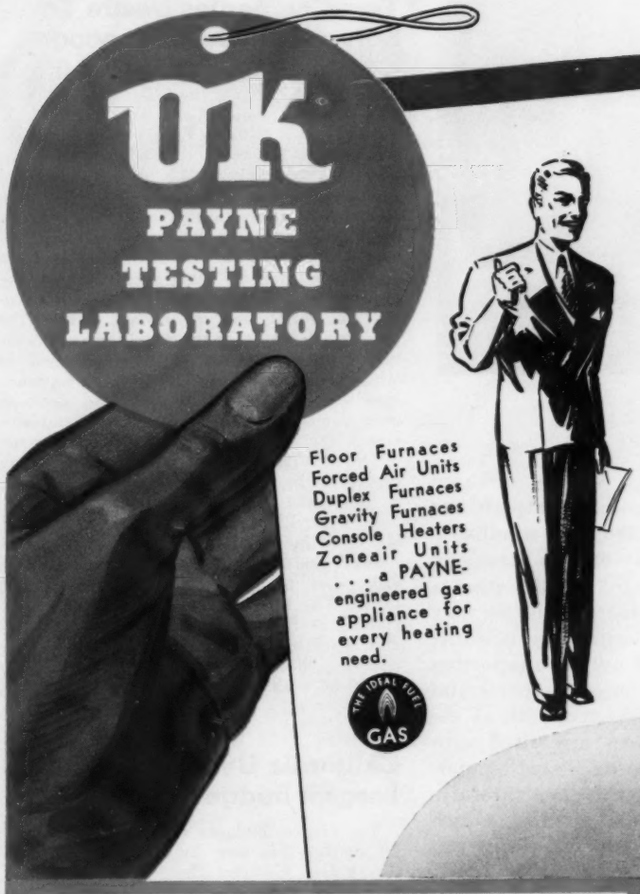


FIG. 1. End view of forms assembled on pipe with cross braces and upper spacing lugs in place.



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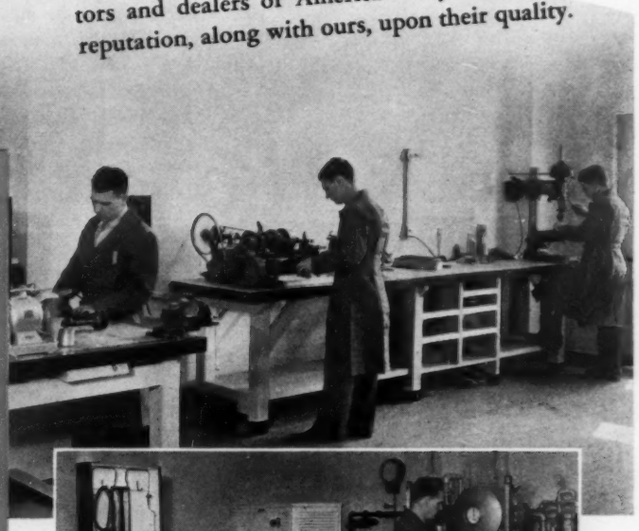
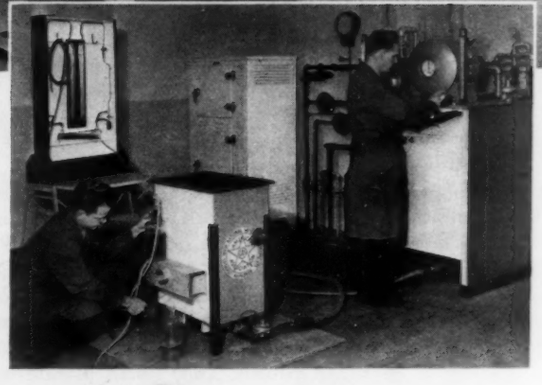
. . . PROTECTING *Your* REPUTATION AS WELL AS OURS!

Before and beyond A.G.A. approval, every PAYNE appliance must meet the Industry's *top* requirements for design, safety, and performance. ☆ Even "Blue Star" standards are far exceeded at our own "proving grounds", manned by PAYNE technicians whose one goal is *perfection.* ☆ Here, innovations constantly developed by PAYNE'S famed engineering staff must pass rigid, relentless tests. Thus, *you*—the utility men, appliance distributors and dealers of America—may stake *your* reputation, along with ours, upon their quality.





CASH PRIZES

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Be sure to see it! It's a new forced air unit to serve a special purpose. Entry Blanks and new unit on display in our booth.

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BEVERLY HILLS • CALIFORNIA

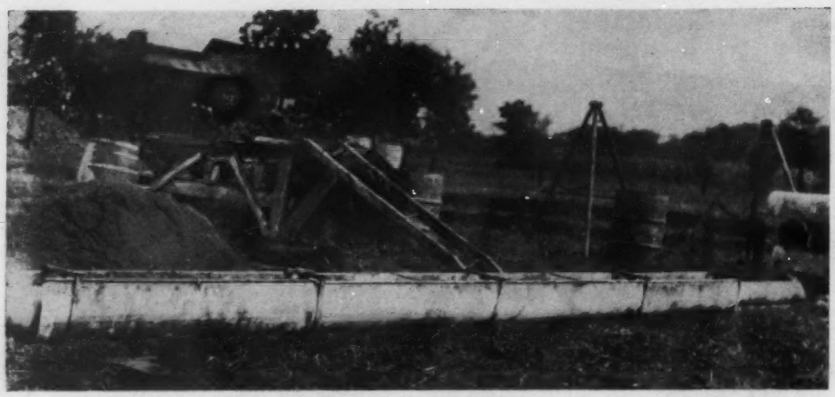


FIG. 2. Showing method of support.

that portions of the line require renewal, the line is cleaned of the commodity being transported so the cut can be made without loss of material. If, however, the corrosion has not progressed far enough to bring the pits to more than one-half the pipe wall thickness, the most damaging pits are covered with a pipe line clamp which becomes a permanent part of the system and is covered with concrete.

The mix is made with a proportion of three parts of sand and one part of cement. The consistency of the mix is such that it will pour from the mixer, but stiff enough that it may be tamped around the pipe in the forms without running.

As the line is being cleaned, progressing from one end of the section to the other, the supports are placed in the bottom of the ditch and the 4-ft. forms laid upon them. The pipe is then lowered until it rests on the lugs in the support saddles and the forms locked with the hinged braces. The 8-ft. sections are placed in position between each 4-ft. section with the flattened roll of the rim joining the other in a cement tight joint. The insides of the forms are lightly brushed with oil so that they will break away from the concrete without clinging, with subsequent breakage and damage.

The concrete is mixed in a small machine, usually of the half-sack size so that the mixture is always fresh, and so that only small sections may be treated as required. As the concrete is poured in the forms, workmen lightly tamp it in place behind and beneath so that it is of uniform thickness and without air-bubbles. The section requiring treatment with concrete is finished during the day and the concrete left 24 hours or more to harden.

To remove the forms, special slings made of short pieces of 10-in. wide rubber belting are used, fitted with metal ends through which holes are punched for a crowbar. Tripods are set above the line and with windlasses the men gently take enough strain on the belting loops to lift the pipe a sufficient distance that the forms may be taken out. While the pipe is in the air, the holes left by the supporting lugs in the combination supports and those left by the serrated teeth of the cross member braces are filled with concrete by men using a small pointing trowel. The pipe is then carefully lowered to the floor of the ditch, which has been cleaned of high spots and rocks to prevent damage to the cover. Several slings and tripods are used at one time to prevent excessive bending of the pipe, as it has been observed that a minute hair-line through the concrete to the metal permits infiltration of corrosive waters that sets up the electrolysis.

Costs have been reduced from time to time due to improvements in the technique until the expenditures are well below 40 cents per running foot. The cost will vary, obviously, because of conditions of the pipe cover, accessibility of the area to be treated, and various other factors.

This type of cover has been used with success whether the line is carrying gas, oil, or water. The type of cover has been used on steep hillsides, level farm land and across swamps, such as found in Mercer County, western Pennsylvania. Most of the pipe line reconditioning is done in the summer months when the soil is reasonably dry so that the concrete will cure with a water-tight bond to the line.

■ ■

Large Well Drilled in N. Y.

A gas well producing 60 million cu. ft. per day was recently drilled in Independence Township, Allegheny County, New York, by the Empire Gas and Fuel Co., Wellsville, N. Y. The well reached the Oriskany sand at 4915 ft. and blew itself in.

Two Companies Desire To Serve Gas To Chattanooga

TWO natural gas companies are seeking to bring natural gas to Chattanooga, Tenn. One, the Chattanooga Gas Co., has applied to the Tennessee Utilities Commission for a rate schedule on gas which would be piped to the city by the Southern Gas Co., an affiliated company, by way of Calhoun, Ga. The other company, a newly formed concern known as the Tennessee Gas & Transmission Corp., recently contested the Chattanooga Gas Co.'s application for a rate schedule, on the grounds that the Chattanooga company's natural gas supply was inadequate to meet the city's needs and that the proposed rates were higher in comparison to those charged in other Tennessee cities. The Utilities Commission granted a delay in the final decision until sometime in May when the Tennessee Gas & Transmission Co. will present its case.

The new Tennessee corporation is being organized by V. S. Johnson, Chicago, John E. Buchanan. Kentucky, and Curtis B. Dall, New York. Plans are being made to build an 800-mile line from Louisiana fields to serve natural gas to Chattanooga, Nashville, Knoxville, and 31 other Tennessee cities and towns. The line will enter Tennessee in the vicinity of Savannah, run south of Nashville and north of Chattanooga to Knoxville. The company has announced that natural gas would be available for users in Tennessee by next winter.

■ ■

California Utilities Allot Largest Budget in 10 Years

The largest budgets since 1930 have been set up for this year by the Southern California Gas Co. and the Southern Counties Gas Co., Los Angeles, it has been announced by F. S. Wade, president of the two companies. A total of $7,750,000 will be required during this year for gas main extensions, service piping, new meters, transmission pipeline extensions and reinforcements, new buildings, and automotive equipment, according to estimates made by the engineering staffs of the two companies.

In appropriating the 1940 budget, company officials estimated that 42,500 new customers would be added during the coming year, and that 200 miles of gas mains would be laid.

■ ■

Bureau Adopts Commercial Pipe Nipple Standards

A commercial standard for the manufacture of brass, copper, steel and wrought iron pipe nipples has been adopted, effective May 10, 1940, by the National Bureau of Standards, U. S. Department of Commerce. The adoption of the standard has been made subsequent to the acceptance of the requirements by a number of manufacturers, distributors and users, following the circulation January 10, 1940, of the recommended standards to interested manufacturers.

■ ■

Citizens Gas Co. Merges With Great Northern

The Great Northern Utilities Co., Shelby, Mont., has recently purchased all holdings of the Citizens Gas Co. for a consideration of $90,000. Negotiations for the sale, pending for over a year, were completed with the approval granted recently by the Securities and Exchange Commission. G. C. Hoyt was manager of the Citizens company at the time of the sale.

"The Answer TO ONE OF OUR BIGGEST PROBLEMS"

THE OHIO FUEL GAS COMPANY

99 No. FRONT STREET — COLUMBUS, OHIO

T. H. KERR, VICE PRESIDENT

March 26, 1940

Mr. G. M. Kirkpatrick,
Blaw-Knox Company,
Pittsburgh, Pa.

Dear Mr. Kirkpatrick:

Our experience with Blaw-Knox gas cleaning equipment has been satisfactory in every instance. A typical example is here in Columbus where our service manager reports as follows:

"Prior to the installation of our Blaw-Knox Gas Cleaning Equipment at our Linden measuring station, dust in our lines was one of our major service problems at certain times during the year. At those times we were required to assign as many as ten or eleven service men with trucks to answer the 50 to 75 service calls per day. These conditions continued for from three to four weeks each year.

Since May 11, 1938 when this equipment was put in service we have had little or no dust trouble, only an isolated case now and then, probably due to dust remaining in the distribution lines.

This equipment certainly has been the answer to what we thought was one of our biggest problems."

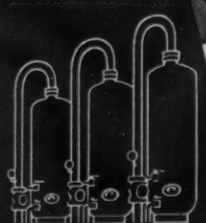
Yours very truly,

T. H. KERR,
Vice-President.

THK/TBE

● More and more gas producers and distributors turn to Blaw-Knox Gas Conditioning to help insure a continuous delivery of clean, properly conditioned gas. Certainly the cost of this equipment is a small premium to pay for insurance against trouble and loss of consumer goodwill. Write for Bulletin No. 1578 and you will understand why Blaw-Knox cleaners are preferred by leading operating engineers.

That's how consumer satisfaction grows! First she used gas for cooking. Then for refrigeration, automatic water heating and house heating. On the basis of increased consumer satisfaction alone, you are warranted in installing Blaw-Knox Gas Conditioning.



Among the advantages of Blaw-Knox Gas Conditioning are

1—Higher capacity, size for size. Will clean more gas per dollar invested in equipment than any other.

2—Gas more thoroughly cleaned, because method of washing (patented) is different.

3—Gas drier, due to better separation equipment. (If desired, equipment will re-saturate with oil or water vapor.)

4—Pressure losses cut. Very little loss in contacting or separating sections.

5—Dust and dirt removed from gas flow.

6—Blaw-Knox Gas Cleaner is the most thoroughly engineered gas cleaning equipment on the market.

BLAW-KNOX
GAS CLEANERS

BLAW-KNOX DIVISION of Blaw-Knox Company • FARMERS BANK BLDG., PITTSBURGH, PA.

THE SERVICING OF GAS ENGINES

By C. REMSCHEL
Southern Counties Gas Company

IN ALMOST every instance where a natural gas engine is installed, it replaces an electric motor. The user of the electric motor has been accustomed to receive a dependable power supply requiring little maintenance or attention. Unless the gas engine delivers equally as good service, the user thereof may become dissatisfied and in consequence it may become difficult not only to hold the business, but the installation may become a liability in the development of new gas engine business.

C. REMSCHEL

It is a fact that in order for a gas engine to render service comparable to that given by an electric motor it must receive a certain amount of service or attention.

The question presents itself as to who is best fitted to render the service and who should bear the expense. Experience has taught us that the average gas engine user is either unable or not inclined to render the little service that is required by the engine. This is particularly true in the smaller installations. It is also true that if the servicing of the engine is left to the average user, the engine does not obtain this service when it should, as it seems to be human nature to delay doing things and spending money until it becomes absolutely necessary. Delays of this kind increase the cost of maintenance and forced shut-downs.

The proper servicing of a gas engine becomes very much more important as a sales item as the difference in operating cost between electric and natural gas power service decreases. Where the electric rates are relatively high as compared to the gas rates, it may become possible to require the consumer to service his own gas engine by having a regular service man do the work and pay for this service from the difference in operating cost.

When the power cost differential is reduced by low electric rates in comparison with the gas cost, the cost of service becomes a very important item. In a situation of this kind, the gas utility, in order to not only hold existing business but promote more business, must resort to means of reducing this service cost to a point where the difference in operating costs, when service cost is included, between the electric motor and gas engine becomes economically attractive. One way of doing this is for the gas utility to render free service.

The gas companies in Southern California have been rendering free service for quite a number of years. One of the companies has been rendering this service for 15 years. Their experience has been that this free service is money well invested.

Free service constitutes all labor that can be done in the field, from adjusting to overhauling the engine, the consumer paying for all parts that may be needed and for any work that cannot be done readily in the field, such as reboring a cylinder, regrinding a piston, etc.

Free service should not be obligatory on the part of the gas utility. In this way the giving of free service can be used in a very effective way in persuading the user to purchase necessary parts that may be required, or for making a proper application of the engine should the case require this.

The approximate cost of rendering free service is 2½c per M c. f. of gas consumed. It is therefore very important that in establishing a gas engine rate that it be made sufficiently high so that this service cost can be readily absorbed without reducing the net rate to a point where the business would not be profitable.

One of the gas companies in Southern California, which has more than 40,000 hp. in gas engines on its system averaging about 80 hp. each and varying from 5 to 400 hp., uses the following method of handling this service:

This system is divided into districts. Each district has a service engineer who is responsible for the engines in his district. He lives in the vicinity of the engines he services. He receives his information of where service is needed from the main office in the district. These service engineers are directly responsible and report to the head of the industrial department in the main office of the company.

All engines on the system are numbered. These numbers designate the district and consequently the service engineer who is responsible for the engine. For instance, Service Engineer John Doe will be allotted numbers 100 to 199. As additional numbers are required, he will be given a new series, possibly 600 to 699, as the numbers in between have in the meantime been allotted to the other service engineers. These numbers are on small oval metal plates an inch and one-half in length and are cemented to the engine with Metal-X cement.

The service engineers are required to make a report on each call that they make. These report forms are approximately 4 in. x 7 in. in pads of 25 each. There is provision on these sheets for name of the consumer, address, horsepower, make of engine, and the number of the engine given it by the gas company, and also sufficient room for the engineer to make his report. At the bottom of this report sheet is place for the time put in on the job, the date and the signature of the service engineer. These reports are sent to the industrial department once each week, where they are checked over, and if attention is required it is taken care of. The sheets are then filed and are used at the end of the year in preparing an annual report of the service rendered throughout the year.

Each service engineer is furnished with a coupe, in the back of which he keeps a complete set of tools and a minimum amount of supplies that are frequently required. These men are subject to call at any time, each service engineer taking care of from 6000 to 10,000 hp. in engines. These service

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• **FOR MANY YEARS an authority on the gas engine and its applications, Mr. Remschel is the author of the *Gas Engine Handbook*, published late in 1939 by the American Gas Association Gas Engine Power Committee. Other gas engine studies by Mr. Remschel were published in G A S in the January and April, 1937, issues. The present study was presented before the Spring Sales Conference of Pacific Coast Gas Association in Los Angeles, February 12-14, 1940.—(Abstract by G A S.)**

---

engineers are all experienced mechanics, are dependable men and are able to command a salary of from $200 to $225 per month with two weeks vacation each year with pay. In Southern California, where the load is mostly pumping water for irrigation and the making of ice, both of which are summer loads, the vacations are taken either in the late fall or early spring.

During the past few years this company has taken on quite a number of automobile engines which are used primarily for pumping water for irrigation. These particular engines do not bring in very much revenue; however, the average rate for gas is high. In consequence, very little, if any, service is rendered these engines. Usually, the owner is able to take care of his needs or he has a nearby garage man take care of his maintenance for him. For a matter of record, these automobile engines are all rated at 20 hp. each.

The service engineers have no particular routine as to inspecting consumers' installations; however, they are subject to call. They keep in close contact with their engines and usually plan ahead when they will want to work on a particular engine. They do this work when it is most convenient to all concerned.

The service engineer is required to record in a day book in the office to which he reports, where he is working so that he may be reached at any time should an emergency arise.

Whenever possible, the service engineer endeavors to obtain assistance from the consumer when doing work on his engine, especially if it is a good sized job such as an overhaul. It is quite important that he try to get as much help as possible from the consumer, as this cuts down the time spent on the engine and in consequence the cost of maintenance, and educates the user in the operation and maintenance of the engine.

At the close of the year, a detailed report of the service rendered is prepared by the industrial department at the main office from the data furnished by the service engineers' reports.

A study has been made to determine the amount of time spent on the different parts of an engine, and the results are shown in Table No. 1.

TABLE NO. 1. TIME SPENT ON ENGINES.

	Per Cent
General overhaul	55.58
General inspection	13.97
Valves	6.17
Bearings	5.97
Ignition	4.09
Cooling water system	3.88
Gaskets	1.78
Lubrication system	1.52
Power take-off	1.18
Timing gears	1.05
Rings	.63
Governor	.57
Starting unit	.57
Wrist pins	.49
Belts	.47
Mixing boxes	.44
Idlers	.39
Flywheels	.36
Exhaust system	.34
Air cleaner	.34
Automatic drives	.21

CALENDAR

May

American Gas Association Distribution Conference—Houston, Texas, May 6-10.

American Gas Association Executive Conference—Palmer House, Chicago, May 23-24.

American Gas Association Joint Production and Chemical Conference—Hotel Pennsylvania, New York City, May 20-22.

American Petroleum Institute—Blackstone and Texas Hotels, Fort Worth, Texas, May 27-31.

Association of Gas Appliance and Equipment Manufacturers—Annual Convention, French Lick Springs Hotel, French Lick, Ind., May 20-22.

Hotel, Restaurant and Gas Sales Conference, A. G. A. — Annual meeting, Atlanta Biltmore Hotel, Atlanta, Ga., May 30-31.

Indiana Gas Association—30th Annual Convention, Evansville, Ind., May 13-14.

International Petroleum Exposition and Congress—Tulsa, Okla., May 18-25.

Natural Gas and Petroleum Association of Canada—17th Annual Convention, Hotel London, London, Ontario, May 30-31.

Natural Gas Section, A. G. A.—Annual Convention, Houston, Texas, May 6-10.

Natural Gasoline Association of America — Annual Convention, Hotel Tulsa, Tulsa, Okla., May 15-17.

Pennsylvania Gas Association—Annual Convention, Skytop, Pa., May 14-16.

June

American Home Economics Association—Hotel Statler, Cleveland, Ohio, June 23-27.

New England Gas Association, Operating Division — Spring meeting, Hotel Viking, Newport, R. I., June 7.

Public Utilities Advertising Association—Annual Convention, Palmer House, Chicago, June 23-26.

July

Canadian Gas Association—Annual Convention, Jasper Park Lodge, Alberta, July 3-5.

Michigan Gas Association — Annual Convention, Grand Hotel, Mackinac Island, Mich., July 8-10.

Pacific Coast Gas Association Northwest Conference — Held in conjunction with Canadian Gas Association, July 3-5.

August

Appalachian Gas Measurement Short Course—Third annual meeting, University of West Virginia, Morgantown, Aug. 19-21.

September

Empire State Gas and Electric Association — Annual Convention, Westchester Country Club, Rye, N. Y., Sept. 26-27.

Pacific Coast Gas Association—Annual convention, Hotel del Coronado, Coronado, Calif., September 18-20.

October

American Gas Association — Annual Convention, Atlantic City, N. J., week of October 7.

December

National Association of Railroad and Utility Commissioners—Miami, Fla., Dec. 10-12.

The work done in general overhaul work is not broken down in the above figures. General inspection is just a call and does not represent any work done.

Analyzing figures collected over a number of years, we find that the total maintenance cost has averaged as follows:

	Per Hp.	*Per M c.f.*
Service cost to gas utility	$0.59	$0.025
Parts cost to consumer	0.30	0.012
Total	$0.89	$0.037

The above figures are on engines, the majority of which have been in constant use for from 10 to 20 years, some even as long as 25 years.

In making up similar figures on late model enclosed vertical multi-cylinder engines, we find that the above cost is in all instances cut to about one-half. It is therefore our belief that on modern engines when properly installed and when given reasonable care, the figures are likely to be as follows:

	Per Hp.	*Per M c.f.*
Service cost to gas utility	$0.30	$0.015
Parts cost to consumer	0.20	0.008
Total	$0.50	$0.023

Some engine manufacturers have offered to render service to their engines on a fixed basis, either on so much per horsepower per month or a certain amount on the basis of thousand cubic feet of gas used. From our experience, this service has not been very satisfactory. The cost has been either so high that the consumer could not afford to pay it, or else the party rendering the service was not getting sufficient money so that he could render the service that the engine should have. In consequence we recommended that care should be taken before entering into any agreement of guaranteed maintenance cost.

Where the engine is installed in a proper manner, using good engineering, and where it receives the proper service after installation, the installation can be considered permanent and there is then little danger of losing it to some other source of power.

Due to the many contacts that the service engineers make in the field, they obtain considerable valuable information on possible new gas engine installations. This information is passed on to the industrial department at the main office, where it is followed up by a power engineer.

Service engineers are cautioned not to recommend any particular make of engine, lubricating oil, etc. They endeavor to be absolutely neutral in matters of recommendation.

Welcome
to HOUSTON
CONVENTION VISITORS

We're happy to join in welcoming to Houston the visitors to the 35th annual meeting of the Natural Gas Section of the American Gas Association. We're glad for you to see at first hand the fastest growing city in the United States. We will welcome any opportunity to make your stay in Houston an enjoyable one.

HOUSTON Natural Gas COMPANY

FRANK C. SMITH, President and General Manager
1316 Texas Avenue . . . In the Petroleum Building . . . C-2351

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BUILDERS OF PIPELINES FOR THE OIL AND GAS INDUSTRY

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OKLAHOMA CITY, OKLAHOMA

Earl A. Benson, President Wm. V. Montin, Secretary-Treasurer

Research Foundation To Study Business Problems

PLANS for the organization of a foundation to do research work in the interests of private business enterprise have been announced by George S. May, Chicago business man. The organization, which has been granted a non-profit Illinois charter, will be known as the George S. May Business Foundation.

"The Foundation," Mr. May said, in explaining its purpose, "will be supported entirely by contributions from members of its board of trustees and its findings will be made available to business groups and educational institutions without charge." Subjects slated for early study include: Bonus payment plans for supervisors and executives; modern methods of market analysis; the effect of public opinion on business; and the value of trade associations to business.

Offices will be opened at once in Chicago and New York, and research engineers will be maintained in 18 leading American cities.

■ ■

Gas Range Campaign Rally Held in Bay Region

The Gas Range Campaign rally held by the East Bay Unit of the Gas Appliance Society recently, in the San Francisco Bay Region, and sponsored by the Gas Appliance Society of California, established a new all-high record of attendance, enthusiasm and program features. A. R. Goodwin, of the Gernhardt-Strohmaier Co., presided. Roy Johnson, of the Jackson Furniture Co., was master of ceremonies.

Featured speakers of the evening were Ray H. Weisbrod of the publicity department of the Pacific Gas and Electric Co., and Frank K. Runyan, president of the Gas Appliance Society of California, and vice president of the Western Merchandise Mart.

■ ■

Northland Natural Adopts Customer Safety Cards

The Northland Natural Gas Corp., Evart, Mich., has recently introduced to its customers a large, red "Safety Card," which is posted near each natural gas consumer's equipment. The card lists precautions that should be taken to find gas leaks, should they occur, and is then placed by the installation foreman in a prominent place near furnace or meter. A number appears on each card, for which the customer is required to give a receipt by writing his name on a card bearing the same number.

■ ■

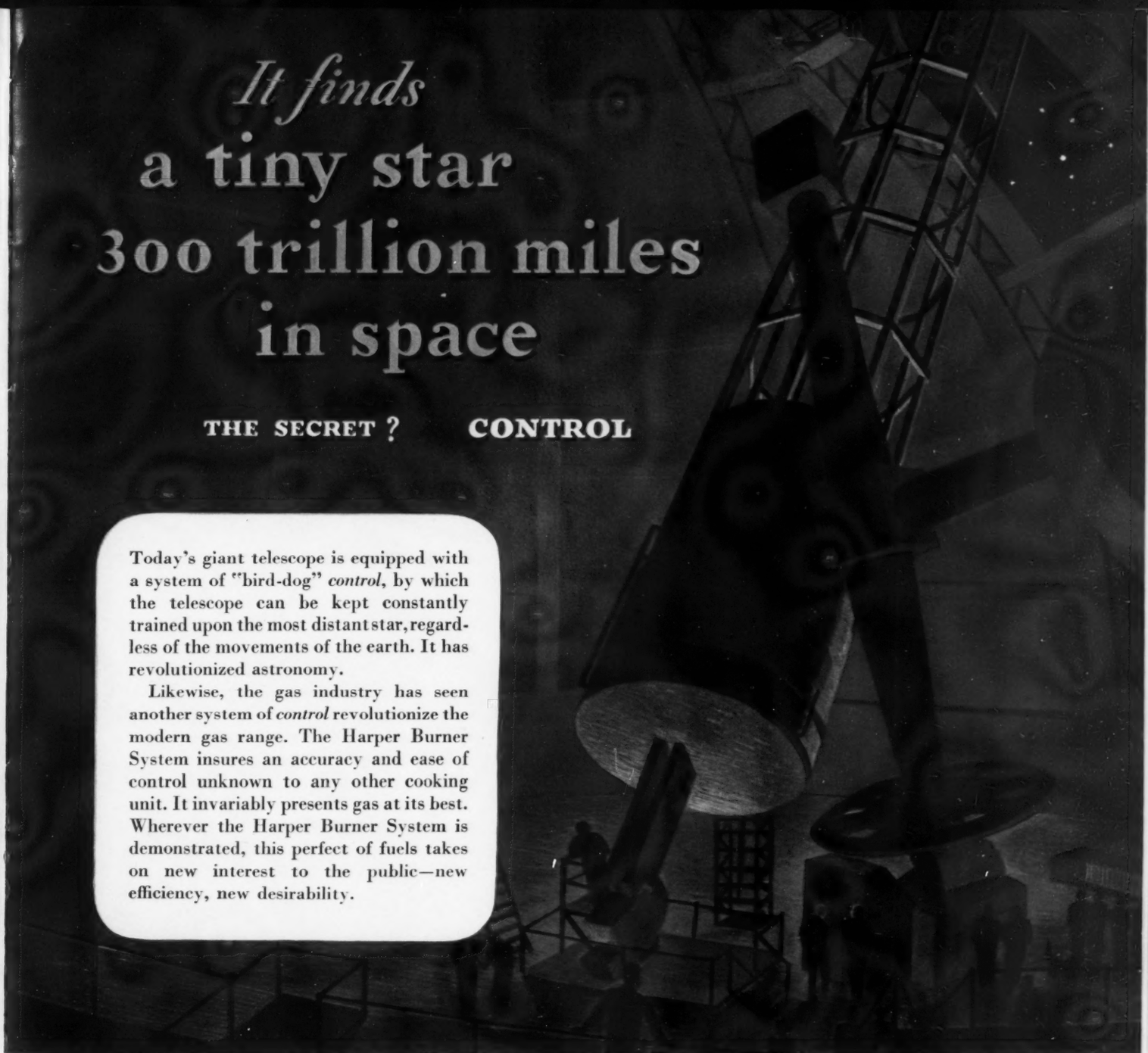
C. H. Seidenglanz, Dallas Appliance Distributor, Dies

Charles H. Seidenglanz, president of Seidenglanz & Co., Dallas, Texas, died recently after a brief illness at the age of 58. The Seidenglanz company are representatives in the Southwest for Reynolds Gas Regulator Co., General Gas Light Co. and Cleveland Heater Co.

Mr. Seidenglanz had a part in the organization of the South Central Gas Association, and was a director of the Southern Gas Association.

■ ■

Natural gas is burned as the "Flame of Eternal Peace" atop the Gettysburg Memorial. President Roosevelt kindled this flame on July 3, 1938, as the climax to the three-day celebration observing the 75th anniversary of the Battle of Gettysburg.



It finds
a tiny star 300 trillion miles in space

THE SECRET ? CONTROL

Today's giant telescope is equipped with a system of "bird-dog" *control*, by which the telescope can be kept constantly trained upon the most distant star, regardless of the movements of the earth. It has revolutionized astronomy.

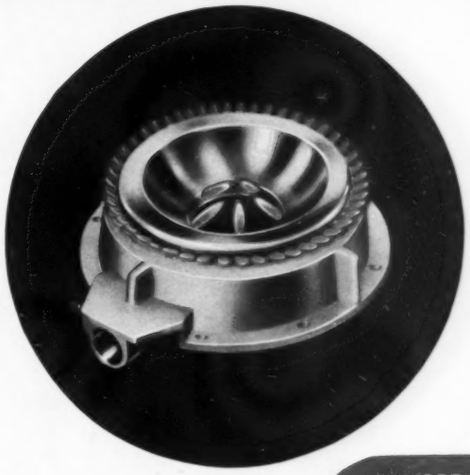
Likewise, the gas industry has seen another system of *control* revolutionize the modern gas range. The Harper Burner System insures an accuracy and ease of control unknown to any other cooking unit. It invariably presents gas at its best. Wherever the Harper Burner System is demonstrated, this perfect of fuels takes on new interest to the public—new efficiency, new desirability.

CONTROL *is the secret here, too*

● The Harper Burner System is a patented invention whereby each of the burners on the range is actually 2 burners in 1 . . . a burner within a burner . . . both operated and controlled by a single handle.

This arrangement affords a high-speed STARTING BURNER to *start* foods boiling and for fast frying . . . plus a small, central, economical COOKING BURNER for *maintaining* the cooking. The COOKING BURNER can be used entirely independently of the STARTING BURNER. No other top burner possesses this vital advantage — which insures easy, accurate control: just the right heat for every type of top-burner cooking . . . every time.

HARPER-WYMAN COMPANY
8562 Vincennes Avenue, Chicago, Ill.



HARPER · BURNER SYSTEM

HARPER BURNER SYSTEM

Demonstrates GAS at its best

SEE OTHER SIDE OF THIS PAGE

Cooking the Harper way retains more vitamins

. . . sells the user on gas cooking by demonstrating "Gas at its best"

● The COOKING BURNER of the Harper Burner System gives such accurate heat control that it always takes more than *one hour* to boil away *one cupful* of water in a covered vessel . . . yet without sacrificing speed of cooking.

As a result, less water is needed for cooking the Harper way—less time. *Excess* water is not necessary, as with ordinary top burners. And it is in this *excess* water that many of the important vitamins and minerals are lost . . . poured down the drain.

If these food elements are not *retained* during cooking, a large proportion of any food's value is lost. Children, especially, need these aids to strong, healthy bodies . . . calcium, phosphorus, iron and vitamins.

Purely from the standpoint of *taste*, too, the Harper Burner System has definite advantages. Cooking authorities agree that the Harper way of cooking gives better-tasting, more delicious foods . . . plump tender vegetables, more succulent meats with a finer flavor, even from the cheaper cuts.

Manufacturers of gas appliances, and utility men alike, favor the Harper Burner System. They have found that every time it is demonstrated, GAS is presented at its best.

The Harper Burner System provides a burner within a burner. The diagram above shows how the COOKING BURNER operates entirely independently of the STARTING BURNER. Yet both are controlled by the same handle.

We shall be glad to send you, without cost, two booklets that tell the complete Harper Burner System story . . . "Modern Methods of Top Burner Cooking" and "The Greatest Cooking Discovery in 40 Years". They should be valuable to anyone interested in the promotion of gas cooking and gas appliances. *Harper-Wyman Company, 8562 Vincennes Avenue, Chicago, Ill.*

HARPER
BURNER SYSTEM

HARPER · BURNER SYSTEM ·

SEE OTHER SIDE OF THIS PAGE

Gas Appliance Sales Spurred By Unusual Discount Plan

A PLAN that captures the "I can get it at a discount" customer and the "cost of use" skeptic at one and the same time is a feature of the Wisconsin Public Service Corp. 1940 sales program. Known as the "75% Discount Plan," it offers new purchasers of gas refrigerators or automatic water heaters an opportunity to apply 75% of the cost of added gas use to the selling price of the appliance.

As announced by A. C. Davey, manager of new business and merchandising for the company, the plan covers both dealer and utility sales and is being generally advertised as a 75% discount on the cost of operating these two appliances, or any others that may be added at the same time. First requirement is the purchase of either of the two major appliances on regular terms. During the next two years of their use monthly credits will be set up on the company's books (for dealer or utility sales) figured at 75% of the amount by which gas service bills for the month exceed those of the previous (base) year.

The top limit on credits earned is $60 per appliance, easily covering the total cost of several types of gas heaters and acting as a substantial discount on other sizes and on gas refrigerators.

New users of service, newlyweds and others without a base month for discount determination will be provided with an average base period until they establish one of their own. At present the plan is limited to competitive gas territory and has been filed for use until April 30.

The company objective for 1940 is a 5% increase of M c.f. per customer, the discount plan being the greatest stimulant to sales for a number of years.

■ ■

New England Divisions Hold Spring Meetings

New developments in heavy duty cooking equipment were stressed at the spring meeting of the Industrial Division of the New England Gas Association held April 18 at the University Club in Boston, Mass. Following the meeting, the members visited the cooperative commercial gas appliance exhibit conducted by the Industrial Division at the New England Hotel Show.

The spring meeting of the Association's Operating Division will be held June 7 at the Hotel Viking, Newport, R. I.

■ ■

Houston Show Coincides With Natural Gas Meeting

The second annual National Home Show, sponsored by the Houston Real Estate Board, is to be held in Houston May 4-9 in conjunction with the meeting of the Natural Gas Section of the A.G.A. According to E. H. Poe, secretary, Natural Gas Section, this show is particularly timely, as there are no exhibits allowed in the hotel headquarters of the Gas Convention. One day of the Home Show has been set aside as "Gas Appliance Day."

■ ■

A.S.M.E. Holds N. Y. Meeting

The American Society of Mechanical Engineers' meeting in New York City was attended by over 70 air conditioning and process engineers. Eugene D. Milener, Secretary, A.G.A. Industrial Gas Section, was the chairman of the meeting.

Among those present at the meeting of gas company executives and range dealers of the St. Louis area: First row: Ed Herhold, American Stove Co.; W. G. Holtsneider, St. Charles Gas Co.; C. C. Young, The Gas Service Co.; John E. Bogan, national sales counsellor, A.G.A.E.M., New York; Charles B. Gillespie, Missouri Power and Light Co.; and Harry Grupe, American Stove Co. Standing: M. R. Moack, Illinois-Iowa Power and Light Co.; B. E. Betts, The Laclede Gas Light Co.; E. D. V. Dickey, Citizens Gas Co. of Hannibal; M. McClurg, The Laclede Gas Light Co.; W. L. Jones, St. Louis County Gas Co.; and W. W. Gaterman, American Stove Co.

A. G. A. E. M. Sponsors CP Range Sales Tour For Utilities in Mid-West Territory

IN order to stimulate gas range sales in general and CP gas range sales in particular, a series of promotional meetings were held during February and March by John E. Bogan, sales counselor of the Association of Gas Appliance and Equipment Manufacturers of New York, and Cy C. Young, assistant new business manager of Gas Service Co., Dallas, and A.G.A.E.M. CP regional manager, throughout Mr. Young's territory, which includes Missouri, Kansas, Oklahoma, Colorado, Wyoming, and New Mexico. Speaking to both the utility and dealer sales managers and salesmen at the meetings in the principal cities of the region, Mr. Bogan presented the CP range program for 1940.

The first meeting was held in St. Louis, and was sponsored by the Laclede Gas Light Co., St. Louis, and Missouri Power & Light Co., Jefferson City. The Kansas City, Mo., meeting was sponsored by the Kansas City Gas Co., and the Kansas City, Kan., meeting was promoted by the Wyandotte County Gas Co. The meetings in Oklahoma, at Tulsa and Oklahoma City, were in charge of the Oklahoma Natural Gas Co. Meetings held in Joplin, Mo., Topeka, Wichita and Beloit, Kan., were sponsored by the Gas Service Co. Meetings were also held in Pueblo and Denver, Colo., and Laramie, Wyo.

At all of the meetings Mr. Young gave a resumé of the accomplishments already made in the sale of CP ranges throughout the country, and introduced Mr. Bogan as a sales advisor with 15 years of practical experience in selling gas ranges and modern gas appliances. In outlining the scope of the CP range market, Mr. Bogan stated: "There are 16 million kitchens already piped for gas. There are between eight and nine million families badly in need of a new range. Dealers and utility companies of the country have joined hands to promote the sale of new and better gas ranges."

■ ■

National Gas Division of IPE To Choose "Grand Old Man"

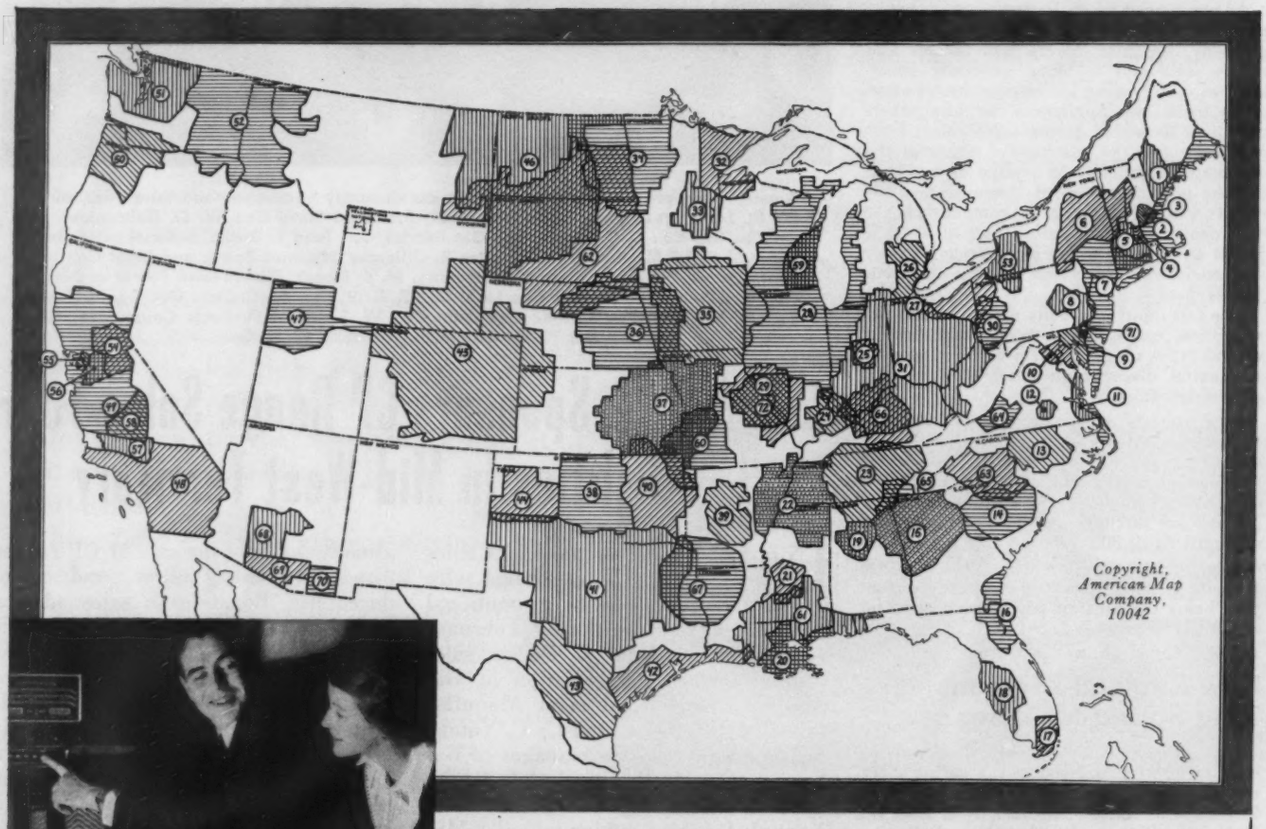
The Natural Gas Division of the petroleum industry will present a gold medal and title of "Grand Old Man" to the individual who represents that branch of the industry, during the 1940 International Petroleum Exposition, to be held in Tulsa, May 18-25. Joseph Bowes, Oklahoma Natural Gas Co., Tulsa, has been appointed chairman of a committee to find nominations for the award. The award will be made on the length of service, and on contributions to that division of the industry.

■ ■

Asphalt Plant to Use Gas

The new St. Louis (Mo.) asphalt plant will be the first municipal enterprise to be furnished with natural gas, assording to Frank J. McDevitt, director of Streets and Sewers. The gas will be bought from the Laclede Gas Light Co., and will be used to furnish heat to dry crushed stone for mixing with asphalt. The plant is expected to be ready for operation early in this month.

1940 P&G CONTEST



MORE THAN 22 MILLION HOMES COVERED BY THE "GUIDING LIGHT" PROGRAM OVER THESE STATIONS

Key to Stations on the P&G WHITE NAPHTHA Coverage Map above

'The Guiding Light' NBC RED NETWORK

Time: 11:45 A.M.—12:00 Noon (E.S.T.)

NO.	CITY	STATION
1	Portland	WCHS
2	Boston	WNAC
3	Manchester	WFEA
4	Worcester	WTAG
5	Hartford	WTIC
6	Schenectady	WGY
7	New York	WEAF
8	Philadelphia	KYW
9	Baltimore	WFBR
10	Washington	WRC
11	Norfolk	WTAR
12	Richmond	WMBG
13	Raleigh	WPTF
14	Columbia	WIS
15	Atlanta	WSB
	Also carries Vic & Sade	
16	Jacksonville	WJAX
17	Miami	WIOD
18	Tampa	WFLA
19	Birmingham	WBRC
	Also carries Vic & Sade	
20	New Orleans	WSMB
21	Jackson	WJDX
22	Memphis	WMC
	Also carries Vic & Sade	
23	Nashville	WSM
24	Evansville	WGBF
25	Indianapolis	WIRE
26	Detroit	WWJ
27	Cleveland	WTAM
28	Chicago	WMAQ
29	St. Louis	KSD
30	Pittsburgh	WCAE
31	Cincinnati	WLW
32	Duluth	WEBC
33	Minneapolis	KSTP
34	Fargo	WDAY
35	Des Moines	WHO
36	Omaha	WOW
37	Kansas City	WDAF
	Also carries The Gospel Singer	
38	Oklahoma City	WKY
39	Little Rock	KARK
40	Tulsa	KVOO
41	Dallas	WFAA
42	Houston	KPRC
43	San Antonio	WOAI
44	Amarillo	KGNC
45	Denver	KOA
46	Bismarck	KFYR
47	Salt Lake City	KDYL
48	Los Angeles	KFI
49	San Francisco	KPO
50	Portland	KGW
51	Seattle	KOMO
52	Spokane	KHQ
53	Buffalo	WBEN
71	Wilmington	WDEL

'The Guiding Light' McClatchy Group

Time: 2:00—2:15 P.M. (P.S.T.)

NO.	CITY	STATION
54	Sacramento	KFBK
55	San Francisco	KSAN
56	Stockton	KWG
57	Bakersfield	KERN
58	Fresno	KMJ

Electrical Transcription (Spot) Stations

NO.	CITY	STATION	PROGRAM
59	Milwaukee	WTMJ	Sidewalk Reporter
60	Springfield	KWTO	Little Crossroads Store
61	New Orleans	WWL	Vic & Sade
62	Yankton	WNAX	Gospel Singer
63	Charlotte	WBT	Vic & Sade
64	Roanoke	WDBJ	The Guiding Light
65	Chattanooga	WDOD	The Guiding Light
66	Louisville	WHAS	The Guiding Light
67	Shreveport	KWKH	The Guiding Light
68	Phoenix	KOY	The Guiding Light
69	Tucson	KTUC	The Guiding Light
70	Bisbee	KSUN	The Guiding Light
72	St. Louis	KWK	Painted Dreams

AGAIN STARS ★ ★ ★ GAS REFRIGERATION

GREAT RADIO AND MAGAZINE TIE-IN CAMPAIGN WILL REACH AUDIENCE OF MILLIONS TO HELP YOU SELL MORE SERVEL ELECTROLUX

SERVEL AGAIN GIVES YOU the benefit of an added push for gas refrigeration! For the third consecutive year, Servel Electrolux refrigerators are featured as prizes in a great P&G White Naphtha Soap Contest . . . advertised in a nationwide radio and magazine campaign!

In the six weeks from May 20 to June 30, millions will read and hear about the gas refrigerator, its exclusive advantages. Every woman in the Contest will compete to win one for her own home. Winners will be announced over the air. Think how many people are going to be talking about Servel Electrolux!

That means it should be easier and more profitable for *you* during these six weeks to talk to them about gas refrigeration.

It's a great chance for you to win additional sales and good will for gas and gas service! Servel, Inc., Evansville, Ind.

FREE $107,000 IN CASH & PRIZES
SIX $1,000 CASH PRIZES,
THIRTY $500 CASH PRIZES and 360
SERVEL ELECTROLUX Refrigerators
6 BIG WEEKLY CONTESTS! THESE PRIZES EACH WEEK!
A BRAND NEW $1,000.00 BILL.
5 CRISP $500.00 BILLS and
60 NEW SERVEL ELECTROLUX REFRIGERATORS
START NOW! IT'S EASY! Finish this sentence in 25 additional words or less:
"I like P&G Soap because_____"
HOW WOULD YOU LIKE $1,000 IN CASH handed over to you—to do anything, buy anything you please!! Or $500.00 all your own?! Or wouldn't it be grand to see a gleaming new Servel Electrolux Refrigerator sitting pretty in your kitchen! You bet it would! And here are 396 opportunities to win these magnificent prizes—360 Servel Electrolux Refrigerators—30 big cash prizes of $500.00 each—6 enormous cash prizes of $1,000.00 each.
6 SEPARATE WEEKLY P and G CONTESTS are starting now! Enter one! Enter all! Enter each one as many times as you like!
THINK WHAT YOU COULD DO with $500.00 or $1,000.00 in cash! Think of the luxury of replacing your old refrigerator with this new, modern streamlined Servel Electrolux—the refrigerator with no moving parts in the freezing system—no wear and tear—no noise. Plenty of room for cool summer drinks, frozen desserts, salads, food storage!
P and G SOAP OFFERS THESE GOOD PRICES so that you'll try it and see how helpful it is in your home! P and G gives you speedy, active, creamy suds. It has an active dirt-loosener that helps you get out ground-in spots and streaks without hard scrubbing or boiling. And my-oh-my how dazzling, snowy-white your white things come out—washable colors bright and gay.
P and G is thrifty, too. One bar for only a few pennies does a 100-piece wash. Don't forget to try P and G for dishes. Cuts grease in a flash—leaves dishes and glassware as clean they sparkle!
SO EASY TO WRITE P and G CONTESTS! Take a look at the sample sentences below! Cut them out. See how simple they are! Then start writing your own. Remember the things you notice about P and G as you're using it! You'll have plenty of material for many entries! And you don't need fancy writing. Just write as you talk!
HURRY! Send in your first entries today! Don't let others get ahead of you! Do it now!
Mrs. H. S. Fitts of Toledo, Ohio, one of last year's winners!
"WONDERFUL! Mr. F was thrilled when I found out I'd won $500.00 in cash for that simple sentence I sent in."
SELLS FOR UP TO $290.00 DELIVERED AND INSTALLED FREE
The 1940 Duchess DE LUXE MODEL
FOR CITIES AND TOWNS
SILENT LONG LIFE
SAVES MONEY
DIAL! ECONOMY!
PLENTY OF ICE
SO AND INSPECT
IT'S DIFFERENT
CUT OUT THESE SAMPLE SENTENCES . . . TO HELP YOU ENTER
WINNERS ANNOUNCED ON RADIO
FOLLOW THESE EASY RULES
The SERVEL ELECTROLUX Gas Refrigerator

EVERY CONTEST AD IS AN AD FOR SERVEL ELECTROLUX

Above is the advertisement which will be used to announce the great 1940 P&G White Naphtha Soap Contest to more than 19,000,000 readers in McCall's, Woman's Home Companion, Household Magazine, Country Gentleman, Farm Journal & Farmer's Wife, Capper's Farmer and This Week.

SALES Slants

THERE'S ONE ON EVERY SALES FORCE

EVERY sales force has at least one of the following five types. They don't last long, fortunately; particularly when the going gets tough. But while they're around they gum up a lot of sales; and nobody has any use for them. Wouldn't you hate to be classified as one of them?

His Dress Is Unique

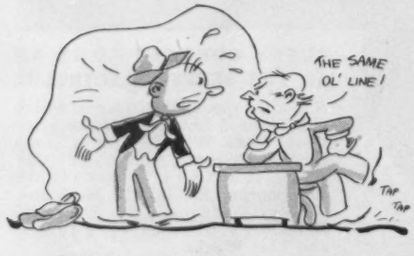
NUMBER One is Sloppy Sol. His tie is never quite tied in the middle of his collar. His shoes need a shine, and last year's soup spots are still to be seen on his vest. He didn't bother to

Sloppy Sol, the Bohemian Business Man.

shave this morning. What was the use? He shaved yesterday. His hair is beginning to get so long it looks like a boyish bob, and he really ought to do something about that dandruff. A herd of elephants walked over his hat, and he must have slept in his trousers last night. Those bags at the knees, as a matter of fact, give him a sort of tired look, as if he's half-way sitting down. And he can't be bothered about cleaning and trimming his finger nails. What the heck! They just grow out again!

A Thousand and One Tales

ALIBI AL is Number Two. He's in the wrong profession. He ought to be somewhere where he could capitalize on his talent for always having an excuse. He starts in the minute he steps into the office in the morning. His first alibi is for being late, and it is a dandy. It would have to be a dandy because he is late every morning! Then he has a good one thought up to tell the boss about how he happened to muff that hot prospect yesterday, and he begins to lay the groundwork for a good alibi on the one he feels he is going to miss today. Alibi Al never by any chance lays the blame at his own door; he couldn't admit he fell down or made a mistake. It is always something over which he has no control that rises up to defeat him. Poor guy! He is so busy proving it wasn't his fault he never has time to really get down to selling.



Alibi Al—an imagination like Poe's.

All Details — No Sales

THEN, as Number Three, comes Fussy Frank. What a man! Or maybe we should write it: "What? A man?" For he is a regular old woman the way he fusses over petty details. He gets himself so snarled up in routine and red tape every morning that

Fussy Frank—All day he's tangled up.

he is the last one to get out on the job. Fussy Frank is pretty good when nothing happens to complicate a sale. He can handle a prospect along with the best of them. But let something unusual arise — something not covered by instructions — and he is lost. His mental processes just stop functioning, and he ends up by not only losing a sale, but making an enemy in the bargain.

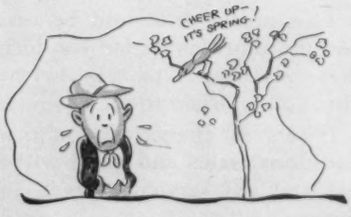
Let's Talk About Me

NUMBER Four is a charming person — if you don't mind a loud noise. His name is Loud Mouth Louie. He has talked more and said less in his thirty years of life on this earth than any other ten men who ever lived. He talks night and day, awake or asleep. And he has only one topic of conversation: himself. To hear him tell it, the art of selling wasn't invented before he came along. The strange thing is: his record doesn't show it. As a matter of fact, he averages less sales than anyone else on the sales force. There aren't many prospects who care to listen to Loud Mouth Louie continuously talking about himself from morning 'til night.

Loud Mouth Louie, a one-pronoun man.

It's Bad and Will Be Worse

PESSIMISTIC Paul is Number Five in this forbidding gallery. What a shock his mother must have got when she first beheld that sour puss of his! He was born with it! Nothing is ever right in his world. If the sun is shining and the birds are singing, he wishes it would rain. If it is raining, he wishes the sun would shine. He beefs about everything. He beefs about having too much territory to cover, and when the boss cuts it down, he beefs about having too little. He beefs at his customers, at his commissions and at his product. He beefs about his fellow salesmen. He just can't figure out what the world is coming to: no business, no honesty, no nothing. Pessimistic Paul is such an expert crepe hanger he ought to make a swell undertaker!

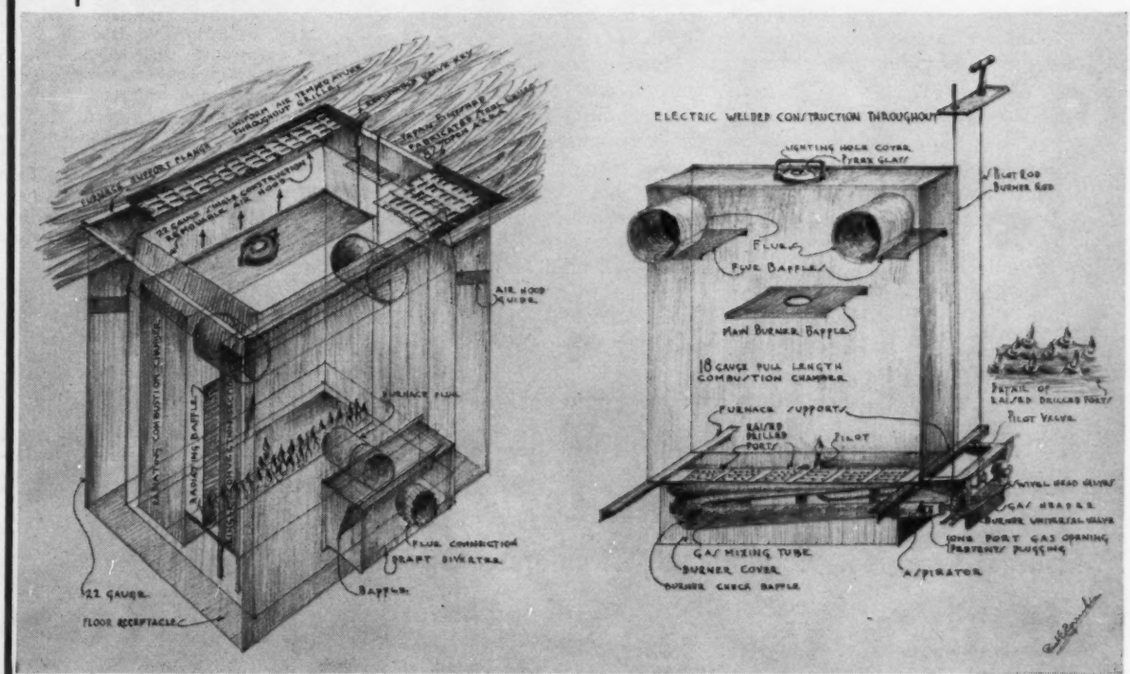


Pessimistic Paul—Such fun at a funeral.

JOHN ZINK BURNERS

John Zink Designs—

a better 50,000 B.t.u. Floor Furnace — $32.50 f.o.b. Tulsa



WE ARE NOW CERTAIN THAT WE ARE MANUFACTURING THE FINEST FLOOR FURNACE IN THE WORLD

50,000 B.t.u. Size, Grille 20″ x 30″, Floor Opening 20¼″ x 30¼″
25,000 B.t.u. Size, Grille 16″ x 20″, Floor Opening 16¼″ x 20¼″
68,000 B.t.u. Size, Grille 24″ x 40″, Floor Opening 24¼″ x 40¼″

John Zink Burners Must Be Good!

JOHN ZINK COMPANY

Burners • Floor Furnaces • Unit Heaters

TULSA, OKLAHOMA NEW YORK CITY

Gas Discussions Feature Annual Meeting Of Maryland Utilities Association

THE Maryland Utilities Association held its annual meeting and election of officers at the Lord Baltimore Hotel, Baltimore, on April 5, according to word received from Association Secretary George F. Jones, Potomac Electric Power Co., Washington, D. C. Harold G. Hayden, comptroller, Potomac Electric Power Co., was elected to the presidency, succeeding Joseph A. Stoll, Baltimore Transit Co. Separate meetings were held in the morning by the gas, electric and transportation groups and a general session terminated the day's gathering in the afternoon.

H. Clay Whiteford, the Washington Suburban Gas Co., was chairman of the group meeting. The speakers who gave addresses included Marvin F. Hall, Washington Suburban Gas Co., who discussed "New Opportunities in Small Plant Operation," and C. C. Barr, Consolidated Gas, Electric Light & Power Co., of Baltimore, whose topic was "Streamlined Distribution." A three-act presentation entitled "Yes Sir, We Give Service!" climaxed a very interesting session.

At the general session in the afternoon Edward L. Bernays, counsel on public relations, New York, discussed "Better Public Relations — A Challenge to the Public Utilities." Joseph Sherbow, people's counsel, Public Service Commissioner of Maryland, whose subject was "Rate Making — The Modern Approach," said in part:

"I have been struck by the terrific waste of time, money and energy involved in the usual rate case. It is so uneconomic that there is no wonder that commissions and utilities alike have sought some remedy that would bring about satisfactory results to the utility and the consumer — I am convinced that regulation of utilities has now entered the stage where negotiations will take the place of formal rate hearings to a greater extent than ever before . . ."

Other officers elected in addition to Mr. Hayden were: Robert L. Smith, Potomac Edison Co., vice president; R. F. Bonsall, Consolidated Gas, Electric Light & Power Co., of Baltimore, treasurer (re-elected), and G. F. Jones, Potomac Electric Power Co., Washington, D. C., secretary.

■ ■

Winners of Display and Ad Contest Announced

Winners of awards in the display men and ad writers' contests, sponsored by the Gas Appliance Society of California as part of its recent spring gas range campaign, have been announced as follows:

Window Display Contest: District 1, Charles W. Davis, San Francisco; District 2, J. J. Ralph, Sacramento; District 3, J. D. O'Connor, Red Bluff.

Ad Writers' Contest: District 1, L. B. Goldsmith, San Francisco, and Ruth Thornton, San Francisco, tied for both first and second prizes; District 2, C. S. Porter, Sacramento; District 3, Merle Wilson, Vallejo.

Both contests were judged by a committee appointed by the San Francisco Advertising Club. It included C. M. West, Standard Oil Co.; Stedman Chandler, Bureau of Advertising, A.N.P.A.; Viola Cross, N. W. Ayer & Son; Ruth Burke, Publicity Director, Palace Hotel; and Christian Cross, Wesco Advertising Agency. Florence Gardner, San Francisco Advertising Club, acted as referee.

■ ■

Industrial Advertising Stressed by Association

"How Industrial Advertising Can Reduce the Cost of Selling" will be the theme of an all-day seminar conference, to be held May 15 in New York City, to celebrate the 35th anniversary of the Technical Publicity Association, New York, oldest and largest chapter of the National Industrial Advertisers Association.

Charles McDonough, of the Combustion Engineering Co., president of the N.I.A.A., will lead a discussion on the theme topic at the opening session. R. A. Wheeler, International Nickel Co., will lead a discussion on "How to Evaluate Results of Industrial Advertising." Subjects of the other seminars will be "How to Analyze Sales Objectives," and "How to Integrate Advertising with Sales Activities."

■ ■

Texas Lunch Room Uses Gas for Eleven Big Jobs

Gas plays an important part in the business firm of M. E. Moses Co., Longview, Texas. This company maintains one of the longest lunch counters in Texas, and uses 15 gas appliances, performing 11 different jobs. The list of appliances covers two coffee urns, two steam tables, two dish washers, one sterilizer, one four-unit pie oven. one broilater, one 80-gal. water heater. one heavy duty range, one deep fat fryer, one engine on cooling system, and two unit heaters.

■ ■

Gas Well Discovered in N. Y.

An abandoned stone quarry just outside of Elmira, N. Y., has produced the first natural gas well in Chemung County. The well, it is estimated by Charles E. Fralich, geologist of the Belmont Quadrangle Co., Bradford, Pa., will develop into 10,000,000 cu. ft. daily.

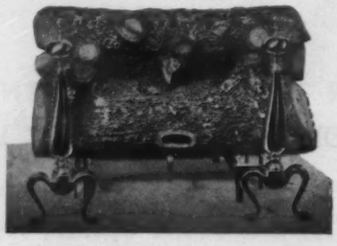
SCIENCE and ENGINEERING SKILL PRODUCED the

The GLO-FIRE Log

Assuring Odorless, Economical, Circulating Operation

Scientific

Unequalled efficiency is attained by preheating the secondary air and causing it to mix with the burning gas in an enclosed chamber of fire clay. This mixture of combusting gases comes into contact with the glowing incandescent surfaces of the upper logs, thus utilizing all of the heat units in the gas you pay for.



A. G. A. APPROVED — NATURAL AND MANUFACTURED GASES

Beautiful

In appearance it is old oak wood, soft in color, a replica of a comfortable wood fire. Every fireplace needs it to complete the appearance of the room, irrespective of other heating arrangements.

Circulating

GLO-FIRE is the only log which continuously circulates the heated air produced, thus creating an even temperature throughout the entire space.

STOCK SIZES

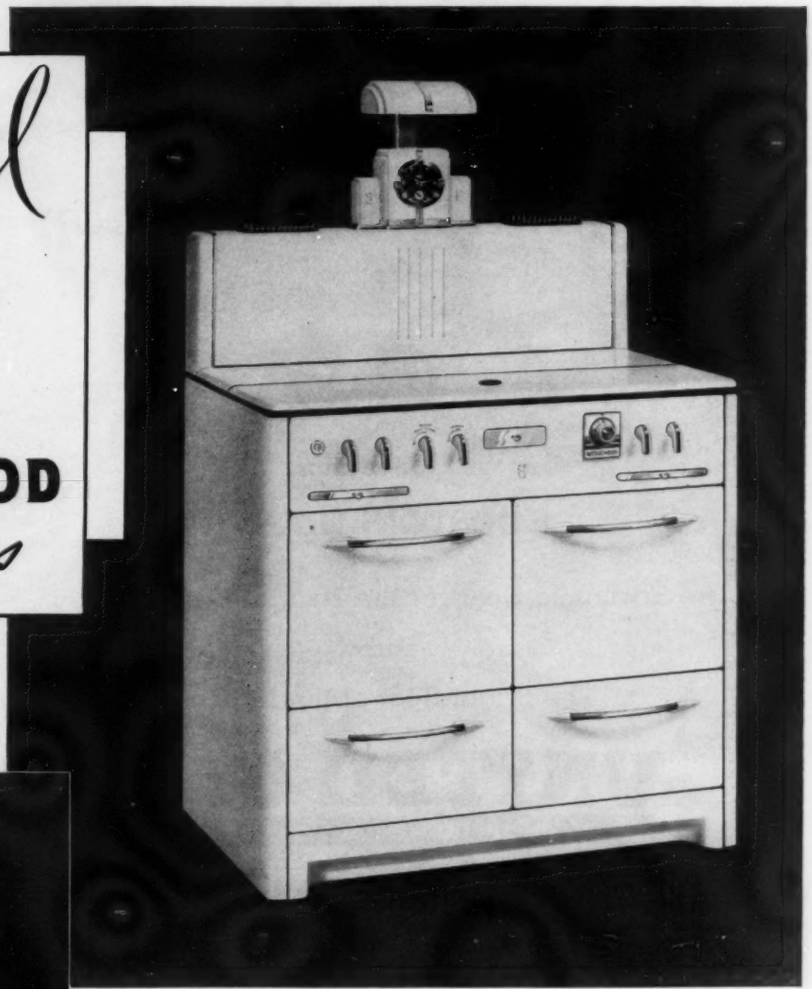
Model 1A—17500 B. T. U.—20 and 22 inches long, 3 logs high.
Model 2A—25000 B. T. U.—24 and 28 inches long, 3 logs high.

Successful Operation Guaranteed with Liquefied Petroleum Gases

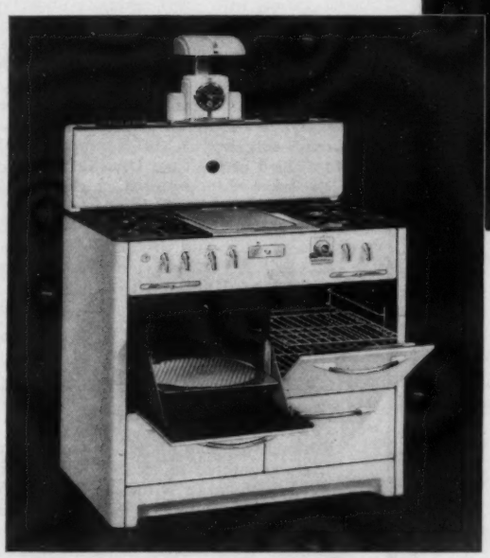
Dealers, Note: One of our dealers sold 300 at retail from one store last season.

GLO-FIRE COMPANY
ELSINORE, CALIFORNIA
MANUFACTURERS

Beautiful New WEDGEWOOD CP Gas Ranges



WEDGEWOOD C P
Model 6385



MODEL 6385—Four burner, divided top range, high broiler with griddle.

MODEL 6285—Four burner, divided top range, with built-in gas heater, low broiler, with griddle.

MODEL 6185 — Four burner, top range, low broiler, with griddle.

NEW FEATURES • NEW STYLING

- High Broiler
- Divided Top
- Top Griddle
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Wedgewood Quality Construction Throughout

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- High Speed Low-Temperature Oven
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Gas THE MODERN FUEL

WEDGEWOOD RANGES Are Factory Built for all Types of Gas.

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UNITED GAS

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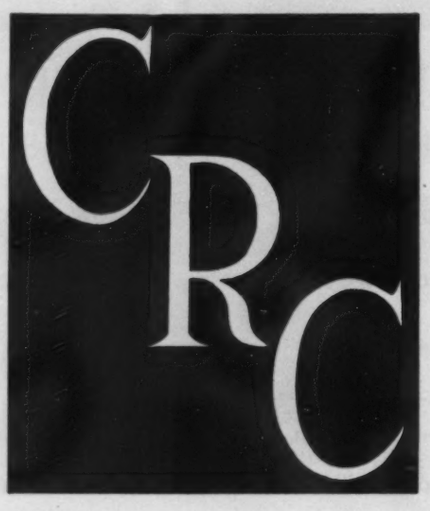

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PIPE LINE

EQUIPMENT AND MATERIALS

HOUSTON, TEXAS

Esperson Building Preston 8231-2

American Meter Co. Perfects Employe Insurance Program

THE American Meter Co., New York, has recently announced that its retirement income plan, inaugurated in November, 1938, for the benefit of employes, has proved successful. Under the plan each employe contributes 2% of monthly earnings up to $250, and 5% in excess of that amount. The company pays an equal amount, and the joint contributions provide a monthly income for the employe when he retires at age 65. Employes who had their thirtieth birthdays after Sept. 1, 1938, and who were born on or after Jan. 3, 1876, are eligible.

A pioneer in providing group protection for employes, American Meter Co. adopted a plan of group life insurance without charge to employes in 1917. Other forms of insurance added subsequently are group accident and health, accidental death and dismemberment, hospitalization and provision for surgical benefits. To date over 90% of the eligible employes of the company are participating under the plan in offices and plants in Albany, Boston, Chicago, Erie, New York, Philadelphia, San Francisco, and Los Angeles.

■ ■

Bureau of Mines Offers Research Fellowships

Three fellowships for postgraduate work and research for the academic year 1940-41 have been offered by the Bureau of Mines in cooperation with the University of Maryland to graduates of universities and technical colleges who have had proper training in engineering or applied physical science. Applications were taken up to May 1.

One of the fellowships will be assigned to research in the Metallurgical Division of the Bureau, a second in the Nonmetals Division, and a third in the Coal Division. The holders of the fellowships become candidates for the degree of Doctor of Philosophy from the Maryland University, are allowed remission of tuition fees, and are paid $600 per year.

In addition to the above three courses, the University of Maryland is offering two graduate fellowships in chemical engineering.

■ ■

Revenues from Gas Sales Increase in January

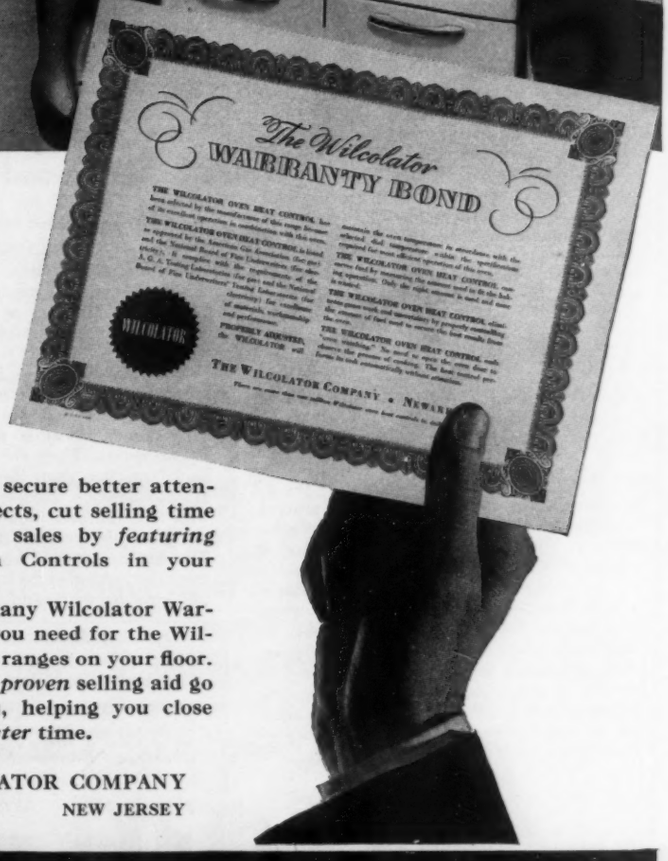
Revenues of manufactured and natural gas utilities amounted to $92,847,300 in January, 1940, as compared with $83,450,100 for the corresponding month of 1939, an increase of 11.3%, it was announced recently by Paul Ryan, chief statistician of the A.G.A.

The manufactured gas industry reported revenues of $35,967,900 for the month, an increase of 7.2% from the same month of the preceding year. The natural gas utilities reported revenues of $56,879,400 for the month, or 14.0% more than for December, 1939.

■ ■

Citizens Gas Co. Installs After-Hours Depository

An outside, after-hours depository has been installed recently by the Citizens Gas and Coke Utility, Indianapolis, Ind., for the accommodation of customers who find it more convenient to pay gas bills after office hours. Envelopes and pencils are available in an outside drawer placed beneath a stainless steel shelf near the depository. If the customer does not have the correct change, excess amount is credited on the next bill.



QUEENSBORO GAS & ELECTRIC APPLIANCE CO., WOODSIDE, N. Y.

—cuts average range selling time 25%!

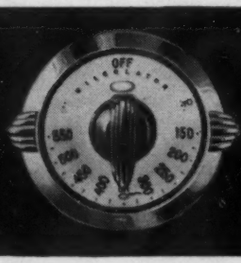
● "Last year we streamlined our selling tactics", says Geo. Byrnes, Partner. "We caught prospects' attention early in the sale with the Wilcolator Warranty Bond . . . and held it by hammering home Wilcolator Oven Control economy, accuracy and efficiency. Prospects were already 'half-sold' when the talk turned to other range features.

"Wilcolator helped me sell 765 ranges last year . . . and, in addition, I figure this method of selling cuts time of the average sale about 25%."

You, too, can secure better attention from prospects, cut selling time and close more sales by *featuring* Wilcolator Oven Controls in your selling.

Write for as many Wilcolator Warranty Bonds as you need for the Wilcolator equipped ranges on your floor. Then watch this *proven* selling aid go to work for you, helping you close *more* sales, in *faster* time.

THE WILCOLATOR COMPANY
NEWARK NEW JERSEY



PROVEN

Over 1,500,000 Wilcolator Oven Controls have been used in domestic cooking ranges. Wilcolator Controls are proven efficient, and proven *profitable* for you to stress in your selling.

UNIQUE

No other Oven Controls have the Wilcolator quality features. Hammer these features home to every prospect . . . and watch the *immediate* difference it makes in your sales and profits!

OIL & GAS *Equipment Review*

Reg. U. S. Pat. Off.

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■ ■

For more information **"ring 3813"** on coupon

Bulk Station Motorpump

Trade Name: Ingersol-Rand Motorpump.

Application: Designed especially for bulk station service.

Features Claimed: The unit is a centrifugal pump and explosion-proof motor built together as a single unit. Special features to eliminate leakage such as a deep stuffing box with special stuffing box lubricant, hardened steel shaft sleeves, packing under the sleeves and oversize shaft and bearings have been incorporated in the pump. Other features such as ample room to repack the glands and a special device for quickly removing the impeller make maintenance easy.—*Ingersoll-Rand Company, 11 Broadway, New York City.*

■ ■

For more information **"ring 3814"** on coupon

Stuffing Box

Trade Name: G-B Red-Hed Stuffing Box.

Description: The stuffing box is built around packing element, the patented Meshtite rubber. The manufacturer claims that it packs off with less friction and less wear on the polished rod and that it maintains a tight fluid seal during all stages of wear. The two halves of the Meshtite rubber fit into each other and instead of interfering they cooperate as the wear advances in encircling the polished rod and in sealing off the fluid. Only slight pressure is needed to make the seal with a Meshtite.—*Gustin-Bacon Mfg. Co., Kansas City, Mo.*

■ ■

For more information **"ring 3815"** on coupon

Acetylene Generator

Trade Name: Oxweld MP-9 Medium-Pressure Acetylene Generator.

Application: An acetylene generator designed to combine portability with the operating advantages of larger units.

Features Claimed: The MP-9 weighs only 129 lbs., and can readily be moved about the shop or in the field. It holds 25 lbs. of size 14 ND Union Carbide and will deliver as much as 50 cu. ft. of acetylene per hour at any desired pressure up to 15 lbs. per sq. in. Several hours of continuous welding or cutting on all except the heaviest work can be obtained from one charging. The generator produces a smooth flow of clean, dry acetylene with no appreciable variations in pressure. Other advantages are two relief valves, one for the generating chamber and the other for the hydraulic back-pressure valve; a large hydraulic back-pressure valve which prevents the carrying over of water to the hose and checks any reverse flow of gases; and an interference mechanism which allows only the proper sequence of operations during recharging.—*Linde Air Products Co., 30 E. 42nd St., New York, N. Y.*

■ ■

For more information **"ring 3816"** on coupon

Two-Stage Pumps

Trade Name: Centrifugal Two-Stage Pumps.

Application: To fill the demand for better pumping equipment at head conditions above the range of single stage types.

Features Claimed: These pumps are suited to all classes of general pumping service where the liquid is of low viscosity and free from foreign matter; they are used for water supply to high buildings, small municipalities, industrial and process plants, for boiler feed, hydraulic elevators, etc. One-piece impellers are made of cast iron, hard bronze, or other alloy, depending on requirements. They are mounted "back to back" on the shaft to assure proper hydraulic balance. Removable wearing rings with streamlined water guiding surfaces are provided on both casing and impeller. The shaft, made of high manganese alloy steel, is journaled in ball bearings of ample size to withstand all thrust and radial loads. Centrifugally-cast bronze shaft sleeves are mounted on the shaft to protect it against abrasive or corrosive action of the liquid. Horizontally divided bronze glands facilitate removal and adjustment of packing. Stuffing boxes are deep to accommodate packing rings. A bronze water seal ring for clear water in the stuffing box on the low pressure stage prevents air from entering the pump chamber and reducing efficiency. The compact casing is horizontally divided so that the upper casing may be lifted to expose the entire rotating element. Two-stage pumps are supplied as basic units, and also as base-mounted units direct-connected to electric motors or steam turbines.—*Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.*

■ ■

For more information **"ring 3817"** on coupon

Wire Rope Clip

Trade Name: Laughlin Safety Clip.

Application: A new wire rope clip which increases holding power and shows a marked lessening of rope distortion.

Features Claimed: This clip contrasts with the "U-bolt" clip which has both nuts and a single flat bearing-surface saddle on one side. Care must be exercised in placing the saddle of the "U-bolt" against the working part of the rope. Ease of application, fewer accidents and savings in rope are among the advantages of the new "safety" clip.—*Thomas Laughlin Co., Portland, Me.*

■ ■

For more information **"ring 3818"** on coupon

Liquid Level Controller

Trade Name: Fisher Interface Liquid Level Controller.

Application: Designed for maintaining a liquid level when handling two liquids of different specific gravities.

Features Claimed: This controller holds the level of the heavier or lower liquid at a pre-determined point and operates a diaphragm control valve to drain off that liquid as it accumulates in the tank. The difficulty of level control where the difference between specific gravities of two liquids is slight is a problem that frequently confronts the oil refinery industry. Fisher Type 246-P Interface Level-Trol is especially adapted to meet the need for this type of control. It can be furnished with various

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3833	3834								

Name.....**Position**.....

Company.....

Address.....

City.....**State**.....

sizes of floats to meet various conditions of specific gravity. Pilot valve incorporates throttling range adjustment and level position adjustment, both of which are readily accessible. This controller has a cast steel housing flanged for mounting on horizontal vessels. The stainless steel float is furnished correctly sized to handle specific gravities as specified. Float rod is also stainless steel. Other construction features include Air-flo cooling fin member, pressure tight bearing, bronze body for pilot valve. The 2-in. x 30-lb. operating medium pressure gages and a Type 254 Fisher filter are standard equipment on this Interface Liquid Level Controller.—*Fisher Governor Co., Marshalltown, Iowa.*

■ ■

For more information **"ring 3819"** on coupon

High Pressure Plug Cock

Trade Name: Leakproof Gage Cock.

Application: A gage cock which can be completely opened or closed with a quarter turn.

Features Claimed: This gage cock has a rated working pressure for water, oil and gas of 2000 lbs. and a test pressure up to 400 lbs. Its body is forged steel and it has a stainless steel plug. Stick lubricant is inserted under a lubricant screw which can be turned down. Turning of the screw transmits hydraulic pressure to the seat, and in the event the cock becomes hard to turn, the pressure exerted will loosen it. Special lubricants are available for steam. This gage cock is made in ¼ in. and ⅜ in. sizes and is wrench-operated.—*Merco Nordstrom Valve Co., 400 Lexington Ave., Pittsburgh, Pa.*

■ ■

For more information **"ring 3820"** on coupon

Packless Valves

Trade Name: Henry "Balanced-Action" Diaphragm Packless Valves.

Application: A valve series with a "balancing action" that assures positive valve opening under all pressure conditions.

Features Claimed: Diaphragm packless valves offer a hermetic seal for volatile gases and liquids. Their value lies in the fact that they have no stem packing and consequently this source of leaks is eliminated. The diaphragms furnish a seal whether the valve is open or closed. Since a leaky valve may be a fire hazard, an expense, and a menace to health, packless valves are recommended for refrigeration gases, cooking and heating gases, gasoline, and other fluids which are dangerous and hard to handle. In packless valves of the imperforate diaphragm or bellows types, a spring is provided to lift the stem from the valve seat when the handwheel is turned to the open position. In Henry packless valves, the pressures above and below the seat are equalized at the instant of opening. This equalizing or balancing action allows the use of a lighter spring and assures positive opening at all times. Since this design permits the use of a very light spring, the diaphragm will be sub-

32% GAIN IN 3 YEARS

The net paid circulation of GAS is now 32 per cent greater than it was in 1936—note the circulation figures below taken from publisher's A.B.C. Statements.

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Gained 1021 Subscribers

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1021 Gain

GAS has more individual subscribers than any other gas publication. Here's the count—A.B.C. Statements December 31, 1939:

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GAS AGE
2797 Individual Mail Subscribers

AMERICAN GAS JOURNAL
1585 Individual Mail Subscribers

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jected to less wear. Also, a non-rotating floating bearing plate is used in the upper stem. Instead of the stem itself, this plate bears on the diaphragm, eliminating torsional wear and strain. The handwheels are oval in shape, affording for the first time a natural gripping surface. The new valves are more compact in design and lighter in weight and are made in all standard types, 2-way, 3-way, and angle. — *Henry Valve Co., 1019 N. Spaulding Ave., Chicago, Ill.*

■ ■

For more information **"ring 3821"** on coupon

Portable Well Drill

Trade Name: The new No. 82 Speed Star.
Description: Compact, all-steel construction; electric welded main frame only 13 ft. long, with main sills 12 in. deep; mounts on truck with standard chassis. All controls are at the operator's fingertips. The chain-driven, free-running reels are controlled by friction clutches and ride on bronze bushings. The 6-cylinder engine is used. The upper section of the mast latches automatically. The mast telescopes; is built for a safe working load of 15,000 lbs.; can be used at either 40-ft. or 50-ft. height. In tearing down, the latch is disengaged from the ground. Crown and sand line sheaves are mounted on Timken roller bearings with large pockets for grease. The casing sheave turns on a big bronze bushing. Bull reel and sand reel brakes are air-cooled. The weight of the brake lever keeps the bull reel from slipping when spudding. The double-crank spudder has a built-in shock absorber, with recoil control, and is adjustable to various weights of tools. Two speeds on bull reel provide for swabbing and other heavy pulling besides ordinary work. — *The Star Drilling Machine Co., Akron, Ohio.*

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For more information **"ring 3822"** on coupon

Rod Stripper

Trade Name: Kibele Rod Stripper.
Application: A Rod Stripper with adjustable packing elements to accommodate any size rod.
Features Claimed: Packings can be backed off whenever it is not desirable to strip, thus saving wear. Packings are either fitted closely to rods or backed off by manipulation of screw handles which have coarse threads to permit rapid movement. The Kibele Stripper also prevents escape of oil and gas while running rods in heading wells. It connects to any size tubing or tee, and all metallic parts are of steel. Kibele also manufactures a blowout preventer which connects to female thread on bottom of stripper. While operation is similar, its construction differs in that the preventer has two retractable metal rams whose sealing surfaces are covered with thin replaceable rubber packings. The stripper and preventer in combination provide ideal protection against uncontrolled pressure surges. — *Kibele Manufacturing Co., Dallas, Texas.*

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415 Pages

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This department of GAS will gladly mail you without obligation any of the selected bulletins listed below. Use the coupon on page 55 of this issue, indicating by number above those you desire.

For more information **"ring 3824"** on coupon

A 32-page catalog covering the description and application of drillable oil field pipe and equipment, with nine pages describing the application of piloted drilling bits, has recently been issued by the Security Engineering Co.

For more information **"ring 3825"** on coupon

The Allis-Chambers Co. has just published a new catalog, No. 151, containing engineering information on special or made-to-order Texrope V-Belt Drives.

For more information **"ring 3826"** on coupon

"Silver Brazing Alloys in the Marine Field," issued by Handy & Harman. This book covers the principles of brazing in connection with marine work and should prove interesting to those who join ferrous or nonferrous metals.

For more information **"ring 3827"** on coupon

A new 8-page bulletin, 2950-1, has just been published by the Cochrane Corp. on baffle-type moisture and oil separators, for use in vertical or horizontal steam, gas and air lines.

For more information **"ring 3828"** on coupon

Catalog D-1, containing information on an improved line of pressure controllers has been recently announced by the Fisher Governor Co.

For more information **"ring 3829"** on coupon

Bulletins No. SP-2006 and SP-1971 describe reversible wrenches and their particular uses. The bulletins are offered by the Chicago Pneumatic Tool Co.

For more information **"ring 3830"** on coupon

A booklet on the Pre-Packed Gravel Liner has just been issued by the J. B. Nelson Co. The booklet gives details on how to use the pre-packed gravel liner, and also where to use it.

For more information **"ring 3831"** on coupon

A new 36-page, fully illustrated catalog on Springs has just been published by the Fort Pitt Spring Co. The various types of springs manufactured are dealt with in this catalog.

For more information **"ring 3832"** on coupon

Back pressure valves, newly developed Type HR and Type HV, are announced by the Connelly Iron Sponge & Governor Co. in their new bulletin No. 301-B-2.

For more information **"ring 3833"** on coupon

The Guiberson Corp. has made available a supplement to their Gas-Lift Manual, featuring flow valve installation design.

For more information **"ring 3834"** on coupon

The Safe-Line Wire Rope Clamp is covered by the National Production Co. in their new circular No. 250-M.

She Simply Sets the Timer

GENERAL CONTROLS TURNS ON THE HEAT

Kay Griffith, featured in "Covered Wagon Days," a Republic Picture.

A PREVIEW OF

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TIMER-THERMOSTAT & REGULAR THERMOSTAT

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Yes, in a gas heating package set, the thermostat is what the customer sees—and beauty is their buy word.

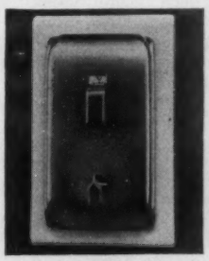
So beauty was our by-word in the design of these new thermostats. And you'll see it amply reflected in their dull chrome cases, in their harmonizing plastic bases, in their blending vertical design, in the snug way they hug a wall.

And they're beauties in more ways than one. Take the Timer-Thermostat, for instance. You simply set the timer, a 13-hour compact clock, and General Controls turns on the heat. An indicating dial shows the number of hours that will elapse before the thermostat will again come into control. At last you can give your customers the luxury of a comfortable house temperature when arising, at a cost they can afford to pay.

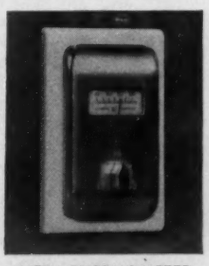
Either the Timer-Thermostat or the Thermometer-Thermostat, with its visible bi-metal thermometer, are now included in all General Controls B-60 Series All-Gas Package Heating Sets. Remember—these thermostats are all-electric, but no outside current is needed. For accessibility, the detachable covers simply snap on to the unbreakable plastic base plate. For versatility, the temperature range is from 50° F. to 90° F., with but ½° F. differential.

See and inspect these new thermostats. You be the judge. See if you don't agree they'll be one of your biggest sales builders from now on!

Request New 1940 Catalog Today

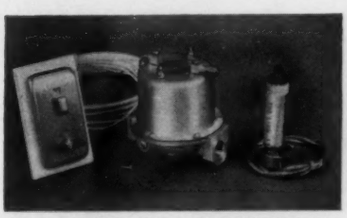


NEW TIMER THERMOSTAT T-80-8-9

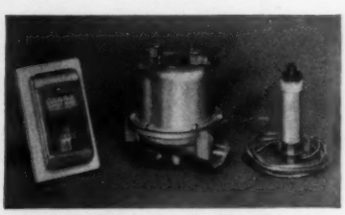


NEW THERMOMETER THERMOSTAT T-80-3-4

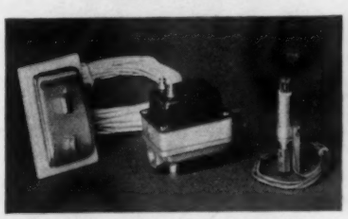
FURNISHED WITH ALL GENERAL CONTROLS B-60 SERIES GAS HEATING PACKAGE SETS



T-95 PACKAGE SET includes B-60-1 Gas Valve, Pilot Generator, T-80-8 Timer-Thermostat and 40 ft. of wire.



T-90 PACKAGE SET includes B-60-1 Gas Valve, Pilot Generator, T-80-3 Thermometer-Thermostat and 40 ft. of wire.



BX-300 PACKAGE SET includes B-60-6 Gas Valve, Pilot Generator, T-80-8 Timer-Thermostat, and 30 ft. of wire.

BX-210 PACKAGE SET includes B-60-6 Gas Valve, Pilot Generator, T-80-2 Thermostat and 30 ft. of wire.

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CURRENT Reading

Temporary National Economic Committee — Volumes 6, 7 and 8, published by Bureau of National Affairs, Washington, D. C., price $6.50 each, or $15 for the three volumes. These volumes cover the proceedings of the Committee during its investigation of the oil industry in September-October, 1939. They include printed reports of the hearings, and all exhibits ordered printed in the Record.

Survey of American Listed Corporations — Sponsored by the Securities and Exchange Commission. The volume is one of a series in the study of the Works Projects Administration, and presents information based on registration statements and annual reports of oil refining and distributing companies filed with the Securities and Exchange Commission. Requests for copies should be made to the Publication Unit, Securities and Exchange Commission, Washington, D. C.

Color Oxides — Published by the Chicago Vitreous Enamel Products Co., Cicero, Ill. This 24-page book is of interest to the porcelain enameling industry. It contains basic information on what color oxides are, how they are made, and how best to handle and apply them.

Salary Determination — John W. Riegel. Published by University of Michigan Press, Ann Arbor, Mich., price $3.50 cloth, or $3 paper. This study, sponsored by the University of Michigan Bureau of Industrial Relations and financed by the Earhart Foundation, deals with 40 American corporations' policies and practices of paying salaries. It is designed to throw light on how judicious salary administration can promote proficiency, cooperation, ambition and satisfaction of approximately 10,000,000 salaried employes in the United States.

Cottrell Process of Electrical Precipitation — Published by the Research Corp., Western Precipitation Corp. The Cottrell Process is described and illustrated with views of various types of installations now operating at smelters, cement mills, power plants, chemical plants, gas works and iron blast furnaces for the recovery of values, the abatement of nuisances and the cleaning of all kinds of gases.

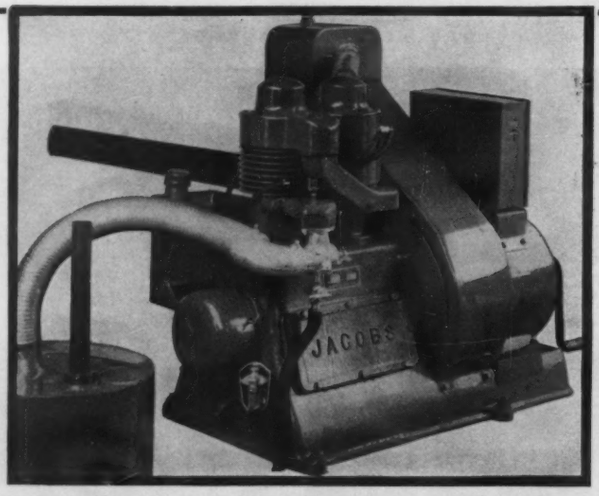
Wrinkle Bending — A booklet describing the recently perfected wrinkle-bending method for bending pipe has been announced by The Linde Air Products Co., unit of Union Carbide and Carbon Corp. This process is finding wide application, particularly in the installation of cross-country pipe lines, or wherever else pipe must be "tailored" to fit. It depends upon the use of the oxy-acetylene flame for heating a narrow band about halfway around the pipe at the point at which a change in direction is desired. When this band has reached a red heat the pipe is bent mechanically, with the heated portion at the inside of the bend. This causes a slight upsetting of the heated metal and produces a change of direction of from 4° to 6°. When greater changes in direction are required, a series of wrinkle bends result in a smooth, long sweep bend of any desired angle. The upset metal projects outwards from the inside of the bend, thus not interfering with the flow of fluid through the pipe and without restricting the diameter at the bend. Copies of this four-page, illustrated booklet are available from the nearest office of The Linde Air Products Co.

Features of World's Largest High-Pressure Condensate Recovery and Pressure Maintenance Plant — Ray C. Fish. *Petroleum Engineer*, Feb., 1940, pp. 121, etc. Designed to process 128,000,000 cu. ft. of gas per day, the Coastal Recycling Corporation's plant, Agua Dulce field, Texas, will serve 12,000 acres. Gathering gas at 2000 lbs. pressure, recovering gasoline at 1500 lbs. pressure, and returning the stripped gas underground at 2500 lbs. pressure, the project marks a significant trend toward high-pressure design.

Gas Injection at Loudon, Illinois— R. J. Sullivan. *Petroleum Technology*, Feb., 1940. 15 pp. Location and reservoir characteristics; Gas injection program; Well spacing and injection wells; Review of operations; Future plans.

Application of Well-Test Data to Study of a Specific Gas Production Problem— M. A. Schellhardt, E. J. Dewees, and W. H. Barlow. Published by the Bureau of Mines, U. S. Department of the Interior. This report illustrates the importance of subsurface temperature data to the study of subsurface leakage of fluid from gas or oil wells. The report includes data obtained in three series of tests of conditions in a gas well in the Buffalo field, Leon County, Texas, that was subject to an unaccounted-for decline in shut-in wellhead pressure from about 2295 to 1445 lbs. per sq. in. gage. The first study was made to determine the existence and character of subsurface leakage or migration of gas from the well. Two other series of tests were conducted after the well had been reconditioned to determine the effect of the remedial measures on the rate of leakage, and, in turn, the effect of elimination or reduction of subsurface leakage on well pressures and temperatures.

What Does the Housing Program Cost?—Published by the United States Housing Authority, Washington, D. C. A 32-page book dealing with the cost of the national slum clearance and public low-rent housing program, based upon projects to date.



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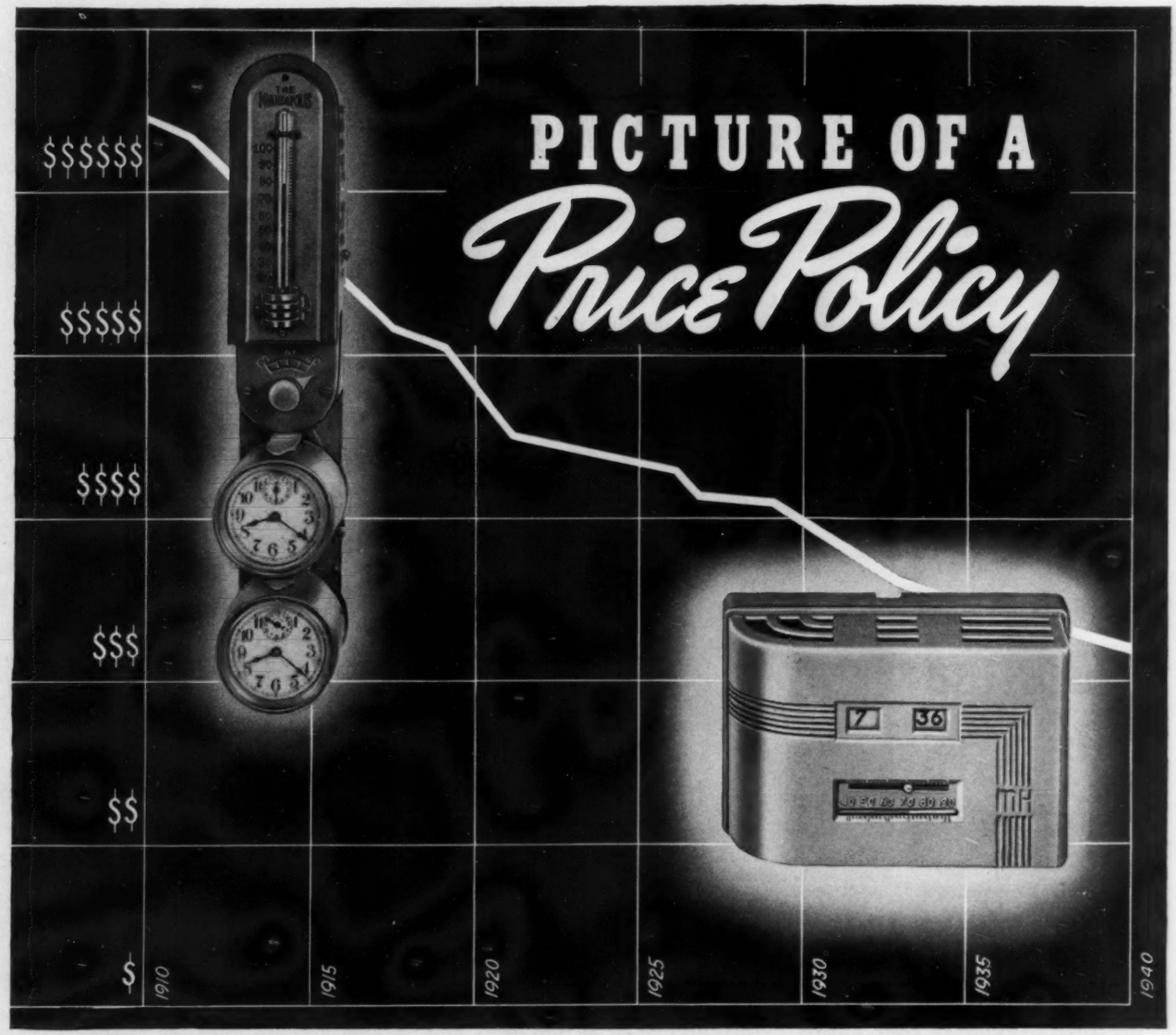
See This Engine in Operation at International Petroleum Exposition (in Oklahoma Building), Tulsa, Oklahoma, May 18 to 25.



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● In addition to constantly improving performance, Minneapolis-Honeywell has consistently reduced control prices. Down through the years its engineers have kept pace with the increasing demands of the automatic heating industry. They have matched new developments with new controls, always working toward the goal of greater values. Compare the price of the thermostat of even ten years ago with that of the 1940 Chronotherm pictured above. Then compare the performance. Fifty years have proved that standardizing on Minneapolis-Honeywell is sound sales insurance for manufacturer and dealer.

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Minneapolis-Honeywell Regulator Company, 2946 Fourth Ave. S., Minneapolis, Minn. Canadian Plant: Toronto, Ontario. European Plant: London, England. Company owned branches in 49 other cities.

Control Systems

F. H. Darlington To Lead New Jersey Group In 1941; 1000 Attend Annual Meeting

BETWEEN 900 and 1000 delegates attended the annual convention of the New Jersey Gas Association held April 9 at Asbury Park, N. J. Frank H. Darlington, superintendent of distribution, Peoples Gas Co., Glassboro, was elected president for the ensuing year, succeeding G. B. Webber, Public Service Electric & Gas Co., of Newark.

Other officers elected were Preston D. Gardner, Public Service Electric & Gas Co., Camden, first vice president; Howard H. Melvin, the Cumberland County Gas Co., Milville, second vice president; and Harry A. Sutton, Public Service Electric & Gas Co., Newark, secretary-treasurer.

Walter C. Beckjord, president of the American Gas Association, addressed the convention on the topic, "A Worthy Past and a Brighter Future." Acknowledging Mr. Beckjord's address, Percy S. Young, Public Service Corp. of New Jersey, stressed close cooperation between the national and state associations.

Home service was represented at the meeting with a discussion by Eliza M. Stephenson, chairman, A. G. A. Home Service Committee, followed by a report by Robin D. McNiece, Public Service Electric & Gas Co., on the development of new appliances.

Four 10-minute talks stressing present day promotional ideas in the fields of house heating, water heating, cooking and refrigeration, were presented at a symposium entitled "Progress in All Four." McCarter Medals and National Safety Council President's Medals were presented to those earning the awards by Edmund W. Wakelee, president, Public Service Corp. of New Jersey.

The convention was adjourned following a banquet at which retiring President Webber was honored.

■ ■

Oklahoma-Arkansas Areas Opened for Gas Development

Approximately 12,000 acres of public domain in Oklahoma and 200 acres in Arkansas were opened April 1 for prospecting and development of oil and gas resources under the provisions of the Federal leasing laws. Because the tracts are located in areas in which there are no district land offices, negotiations for leasing the lands are being conducted at the General Land Office, Washington, D. C.

In addition to these areas in Oklahoma and Arkansas, more than 1,500,000 acres in 13 western states were opened for prospecting by the government during March. (See *G A S*, April, 1940, p. 66.)

■ ■

FPC to Rule on Coverage Of Natural Gas Act

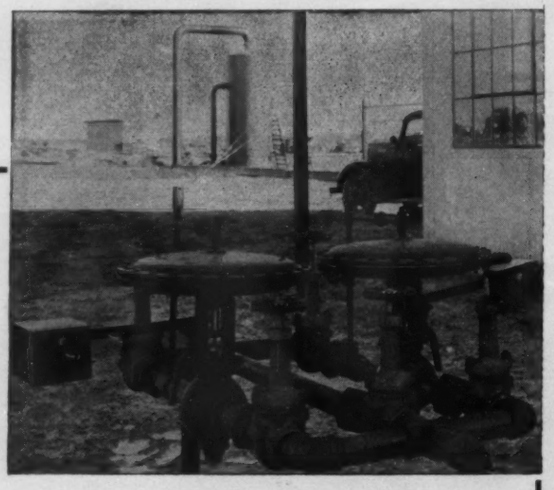
The Federal Power Commission has scheduled public hearings commencing May 6 on the Ohio Oil Co. case, which involves the question of whether an oil company engaged in the production and gathering of natural gas and in the sale of that gas to one who takes it into interstate commerce is a natural gas company and covered by the Act. If the company is covered by the Natural Gas Act, then it must furnish certain reports to the Federal Power Commission and adopt the system of accounts prescribed by the commission.

■ ■

Texas Cities Co. Has Open House in Galveston

The new Galveston, Texas, office building of the Texas Cities Gas Co. was formally opened March 4, 5, 6, and 7 by open house activities which were attended by more than 2000 people. P. E. Nicholls, local manager, was in charge of the ceremonies.

Preferred by Large Refining Companies



C-F 2" Low-Pressure Regulators with Automatic Cut-Off Attachment

The two Regulators here seen are on a gas line leading to a Texas refinery, which is owned by one of the great oil-producing companies. Like all C-F low-pressure Regulators, they afford protection in case of failure of gas supply. Their merits include sturdy construction, sure precision, and long life, as well as convenience of installation and maintenance.

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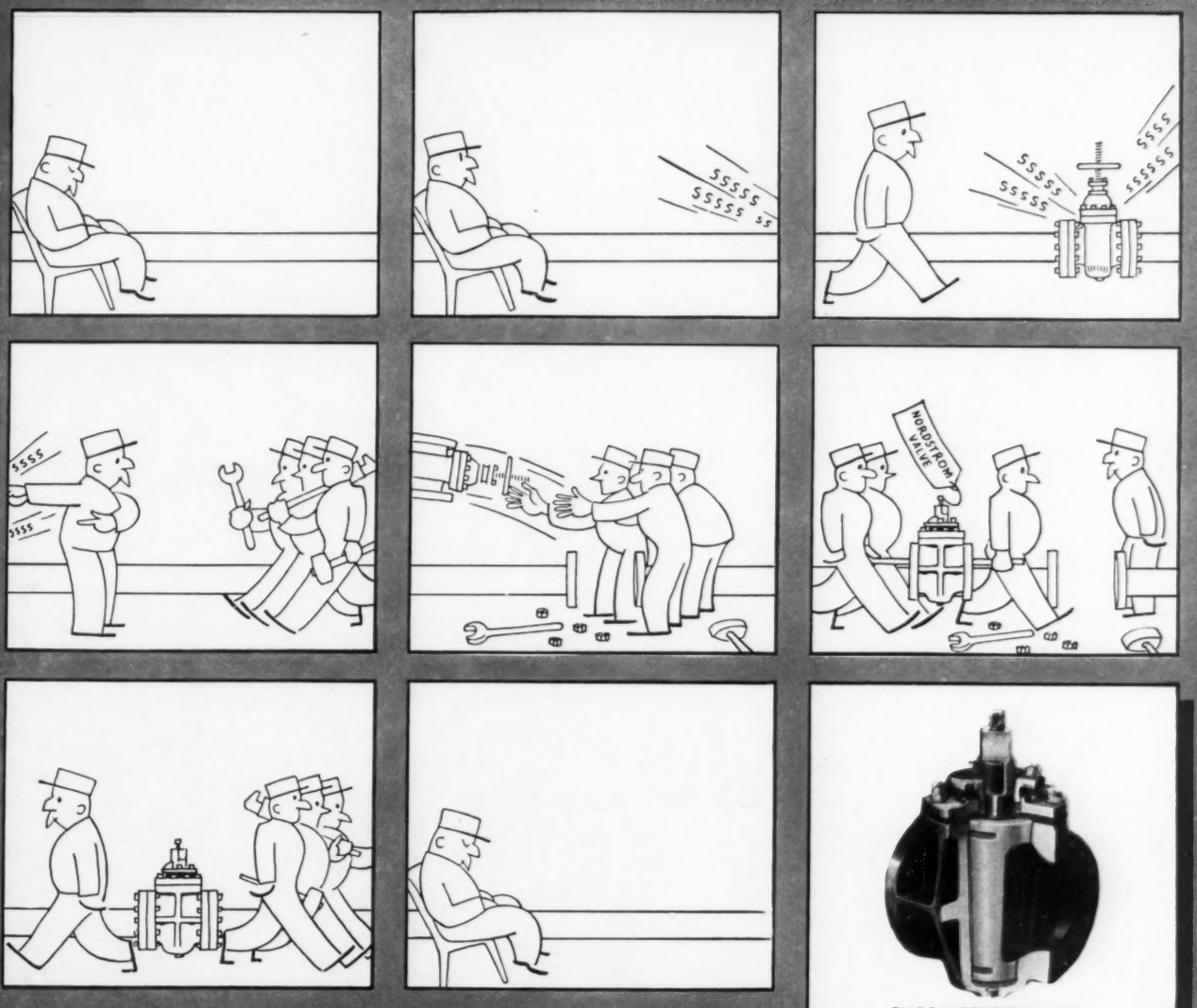

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DON'T WAIT FOR LEAKS TO WARN YOU

In handling gas, chemicals, slurries, oil or other fluids, the ordinary valve is subject to leakage caused by packing failure, improper seating, channeling and corrosion. In the Nordstrom Lubricated Valve the plug is never separated from its seat. None of the line contents can enter between the seat and plug; none can clog the valve to prevent a tight closure.

The patented "Sealdport" system of Nordstrom Valve lubrication comprises an arrangement of lubricant grooves whereby, when the plug is in closed position, the seat between body and plug is provided with a complete framework of lubricant grooves, all interconnected and surrounding the port in the body. Hydraulic pressure is applied by the lubricant screw.

Nordstrom LUBRICATED VALVES

Sealdport Lubrication

MERCO NORDSTROM VALVE COMPANY—*a Subsidiary of* Pittsburgh Equitable Meter Company

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"He say—'Nordstrom Valve no stickee, no leakee.'"

Commercial Range Standards Approved by Committee

AT the 45th meeting of the Approval Requirements Committee held on March 21, 1940, recommended revisions to American Standard Approval Requirements for hotel and restaurant ranges were reviewed and approved with minor revisions. A tentative set of standards covering deep fat fryers was also considered and likewise approved. Both become effective January 1, 1941. Mimeographed copies of these standards have been prepared and distributed to manufacturers. Both sets of standards are being placed in the hands of the American Standards Association for acceptance as American Standard.

One of the principal revisions to the current requirements for hotel and restaurant ranges is their extension to cover unit broilers. Necessary changes in test gases and test pressures have been incorporated in line with the recommendations made by the Subcommittee on Test Gases and Test Pressures. A section has been added covering heating capacity of hot top ranges which specifies a minimum speed of heating for such tops. Provision has also been made for a permanent marking of models provided with detachable legs or bases, the removal of which may affect operation, by requiring a statement "For Use Only With Legs or Ventilated Base." The former section covering performance tests on propane gas has been further extended to include all liquefied petroleum gases, thus permitting approval of equipment of this type for such products. New standards covering deep fat fryers limit quantity of cooking fluid to 300 lbs. or less.

Although these requirements do not become effective until January 1, 1941, manufacturers may submit equipment for test for compliance with them in advance of that date. Further information may be obtained from the American Gas Association Testing Laboratories.

■ ■

Home Economics Students Visit A.G.A. Laboratories

A group of 16 students of the home economics department of Iowa State College visited the American Gas Association's Cleveland Laboratories on March 19. The party was in charge of V. Enid Sater, assistant professor of the College's department of household equipment. This marked the third consecutive year in which a visit was paid the Laboratories by this group.

The household equipment department of Iowa State College has been greatly interested in the work of the Laboratories and has recognized them as an outstanding example of an agency devoted to the protection of the consumer by the preparation and application of standards covering equipment purchased by him. Annual visits to the Laboratories have supplemented class instruction covering domestic equipment.

■ ■

Wisconsin U. Given Home Economics Practice House

The Wisconsin Utilities Association has made the first payment of $10,000 for the construction of a $20.000 home economics practice house for students at the University of Wisconsin at Madison. Eight senior home economics students will live in the home for a period of three weeks at a time to receive instruction in the use of modern appliances. The new building will replace an outmoded structure in which 30-year-old gas ranges were used.

Pacific Coast Technical Men Hold Spring Conference in Los Angeles

ATTENDED by representatives of all member companies of the Pacific Coast Gas Association, the Spring Technical Conference was held April 11 and 12 in the Embassy Auditorium in Los Angeles, under the direction of Harry J. Smith, chairman of the Technical Section.

A distinguished guest at the Conference was Julian Garrett, president of the Canadian Gas Association, and general manager of Northwestern Utilities, Ltd., who spoke at one of the sessions on "Protection of a Transmission System Against Surface Subsidence."

General sessions were held at the beginning and end of the two-day program. At the opening session, Lee Holtz, Southern California Gas Co., as chairman of the Committee on Customers' Service Costs, presented a progress report on the activities of that committee. A discussion of gas holder inspections under General Order 94, issued by the California Railroad Commission, was led by A. B. Allyne, associate engineer of the Railroad Commission, and short talks were given by various members of the P.C.G.A. committee, who collaborated with the C.R.C. in developing the order. Closing the first general session was a short history of the "Development of the Liquefied Petroleum Gas Industry," given by C. L. Parkhill, of Parkhill-Wade, Los Angeles.

During the second general session, Ford Ashman Carpenter, consultant in Meteorology and Aeronautics, Los Angeles Chamber of Commerce, discussed a subject that is always of interest — the weather — under the title, "The Influence of Latitude on the Weather of the Pacific Coast." The speaker showed, by use of a large weather map, the various degrees and extremes of weather that can be expected in the United States and on the Pacific Coast, the latter being a region of extremes, exhibiting the hottest and coldest temperatures, the least and greatest rainfall, the heaviest snowfall and the lowest and highest altitudes.

Robert T. Knapp, associate professor of hydraulic engineering, California Institute of Technology, discussed "Pipe Line Stream Crossings," from the standpoint of the forces exerted by the stream on the pipe line and supporting structures. He showed by demonstration that a silt- or sand-laden stream was much more buoyant (tending to lift the pipe line) than is clear water. He also explained that a buoyant effect will also be exerted on a pipe near the bottom of a stream because of the greater water velocity above than below the pipe; that the bed of a stream during flood may be much deeper than realized, as a channel is temporarily gouged out and afterwards refilled with solid matter; that the accumulation of debris against the pipe line can exert enormous forces.

Reports of the various subcommittees were read and discussed at the simultaneous sessions of Distribution, Transmission, Utilization, and Production Committees. The programs presented at each session were directed and planned by the committee chairmen, who were: C. P. de Jonge, San Diego Consolidated Gas & Electric Co., Distribution; Grove Lawrence, Southern California Gas Co., Transmission; John C. Mueller, Payne Furnace & Supply Co., Utilization; M. L. Fort, Industrial Fuel Supply Co., Production.

Next P. C. G. A. meeting will be the Northwest Conference to be held at Jasper Park Lodge, Alberta, Canada.

■ ■

Hotel and Restaurant Men Meet in Atlanta, May 30-31

This year the Hotel, Restaurant and Commercial Gas Sales Conference, sponsored by the Industrial Gas Section of the American Gas Association, will be held in Atlanta, at the Atlanta Biltmore Hotel, May 30 and 31.

Featured speaker will be Eugene J. Stern, vice president, Georgia Public Utilities Co. Other highlights of the two-day meeting will be a Sales Clinic in the field of volume water heating, participated in by W. H. Ligon, Atlanta Gas Light Co., Atlanta; A. V. Leudemann, Mears-Kane-Ofeldt, Inc., New York; and Walter G. Groth, The Burkay Co., Toledo, and a small appliance symposium and demonstration, at which Harry A. Sutton, Public Service Electric & Gas Co., Newark; E. V. Fineran, Washington Gas Light Co., Washington; and Charles W. Gale, The Knoxville Gas Co., Knoxville, will speak from a platform display of modern appliances available on the market today for commercial cooking and other purposes.

Franklin T. Rainey, chairman, A.G.A. Industrial Gas Section, will summarize the entire Conference in the form of an interpretation entitled, "You've Heard It All — How Can You Put It To Use?"

■ ■

New Mexico Co. Moves

The Clovis, N. M., branch of the New Mexico Eastern Gas Co. recently moved into a new office building at 116 East Grand, Clovis. Open house activities arranged by E. M. Kelley, local manager, were held Sunday afternoon, March 24.

INDUSTRY *Personalities*

R. D. Maxson, western division manager of the Public Service Co. of Northern Illinois, has recently been appointed manager of gas operations for the company. Mr. Maxson has been with the company since 1921, following his graduation from the University of Illinois. Succeeding him as western division manager is **Murray Joslin,** who was previously operating superintendent in the southern division. Mr. Joslin joined the company in 1923 as an inspector. **C. N. Lauritsen,** assistant operating superintendent in the southern division, replaces Mr. Joslin as operating superintendent.

J. W. Leaper, manager of the Logan, Ohio, branch of the Ohio Fuel Gas Co., was honored recently for having completed seven years of service with the company.

S. D. Whiteman, vice president and general manager of the Sioux Falls (S. D.) Gas Co., has recently resigned from his position with that company to join R. H. Beaton & Co., Columbus, Ohio, owners and operators of natural gas properties. Mr. Whiteman's retirement was announced following the filing of an application with the SEC for permission to sell the Sioux Falls company to the Central Electric and Telephone Co., Sioux City, Iowa. Mr. Whiteman had been with the Associated Gas and Electric System, holding company controlling the Sioux Falls utility, for 17 years.

E. Clark Deane, office manager of the Sioux Falls Gas Co., has been appointed manager of the company to succeed Mr. Whiteman.

Porter Bryan, for several years with the Lone Star Gas System, has been named superintendent of Community Natural Gas Co. at San Angelo, Texas, succeeding **J. A. Bramblett. E. L. Buelow** is manager of the San Angelo district of Community Natural.

Paul R. Johnson, president, and **Donald Stewart,** vice president and general counsel, Union Gas System, Inc., Independence, Kan., were the featured speakers at the third industrial dinner sponsored recently by the Chamber of Commerce, at Coffeyville, Kan.

WILLIAM H. REUL

William H. Reul, of the Cincinnati Gas & Electric Co., celebrates his 50th anniversary as a Systemite in June. He is close to the top of the list of company employes, having the longest record for continuous service. When he was 14, Mr. Reul was taken on by the Siemens Lungren Illuminating Co., to service gas arc lamps. In 1909, he transferred to company employ, setting meters, turning on and off gas, and handling service complaints. In 1917, he was made superintendent of Warehouse No. 1, the storage and distributing point for gas ranges and heaters.

Dale Remington, advertising manager of the Wisconsin Public Service Corp., Green Bay, has been presented the Gold Medal Award for writing one of the 20 best business letters in a contest conducted by the Dartnell Corp. of Chicago. The contest was fourth in a series designed to raise the standards of business letter writing.

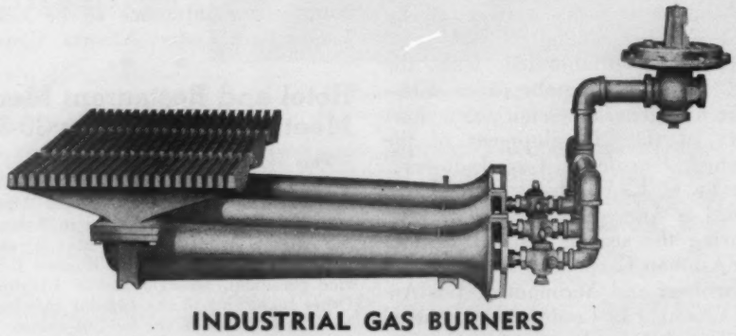
R. L. Dunten, industrial and gas sales engineer for Oklahoma Power and Water Co., Sand Springs, Okla., resigned recently to accept a position with the Southwestern Light and Power Co. at Chickasha, where he will have charge of domestic and commercial sales promotion.

Violet Hollis, home counselor for the Montana-Dakota Utilities Co., has recently spent a month at the Crookston, Minn., branch of the company, where she introduced home service work to gas consumers in the city. Mrs. Hollis conducted a three-day cooking school, held open house teas, and called on gas users and purchasers of new gas appliances.

Frank Brown, after 40 years of continuous service with the East Ohio Gas Co., retired on March 1 as manager of the Struthers, Ohio, office, This is said to be longer than the service of any other employe or official. For 39 years Mr. Brown was not absent from his work a single day. He began as a timekeeper.

Mrs. C. R. Warren, home service director of the Lake Shore Gas Co., Ashtabula, Ohio, has recently resigned from that position.

J. Lorn McLean, formerly with Price, Waterhouse & Co., Toronto, Canada, was recently appointed assistant to the vice president and comptroller of the British Columbia Electric Railway Co., Vancouver, B. C.



INDUSTRIAL GAS BURNERS

Primarily designed for high pressure vertical type boilers, viz., press machine, vulcanizing, dairy boilers, etc.

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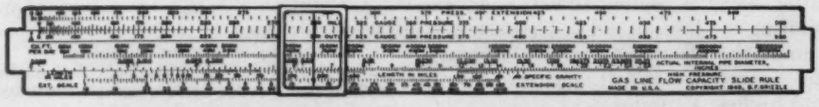
High Pressure Gas Line Flow Capacity Slide Rule

10" Rule



New type rule which computes directly the difference in the squares of the absolute pressures by merely setting the outlet gauge pressure opposite the inlet gauge pressure. RANGE: Cu. ft. of gas per day, 8 M to 200,000 M. Inlet pressure, 30 to 500 lbs.; outlet pressure, 0 to 500 lbs. Length of line, 1 to 400 miles. Specific gravity, .35 to 1.50. Diameter of pipe, 2" to 26" in divisions so that any unusual internal pipe diameter may be figured within a very close range. **This rule will be found very useful to engineers, dispatchers and pipe line operators for quick calculation of line sizes and flow capacities, as well as inlet and outlet gauge pressures.**

EASY TO READ AND OPERATE - INSTRUCTIONS WITH EACH RULE

Price $2.00 each, postage prepaid.

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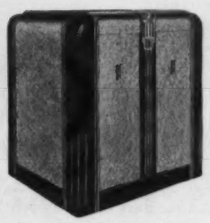
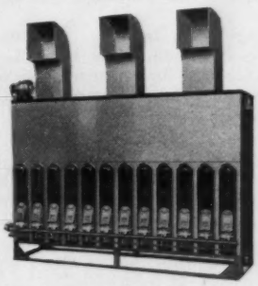


Series "FS" Air-Conditioning Furnace for the home that demands the best.

Series "EPS" Air-Conditioning Furnace. De luxe features at economy prices.



The Mueller Unit Heater for large space-heating requirements. Available in floor type as shown, also in suspended type.

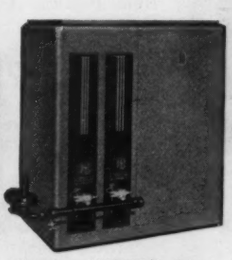
Series "A" Steam and Hot Water Boiler for residential installation.

Series "C" Steam and Hot Water Boiler for large residential and commercial use.

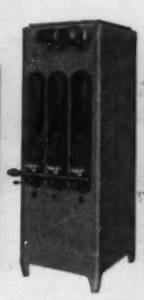
Dual Flor-Aire Furnace for baseboard installation between rooms.

Flor-Aire Furnace for basementless homes. No floor space required.

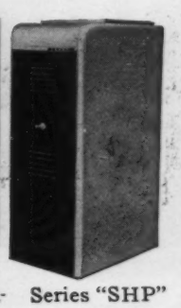
Series "E" Gravity Furnace. Multiple unit construction simplifies stocking.



Series "CIE" Air-Conditioning Furnace, for those who prefer cast iron construction.



MUELLER-AIRE for stores, shops, basementless homes.



Series "SHP" Air-Conditioning Furnace for the small home.

Write for Literature on the Complete Mueller Gas-fired Line

L. J. Mueller Furnace Co.

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OWNERS of residential, commercial and industrial buildings look to MUELLER for their heating needs, because MUELLER has everything—quality with economy; dependable performance; functional styling; and a wide selection of gas furnaces and boilers—a size for every need—priced to meet every budget.

In addition, Mueller offers—
ENGINEERING—Mueller has a complete engineering staff devoted exclusively to plans and layouts; a service free to you. Send in your plans, or see our Sales Engineer in your territory.

EXCLUSIVE MUELLER FEATURES. The Heat-Speeder Section; a steel gas furnace section which heats rooms from six to eight times faster than old style units.

The Heat Levelizer; automatically varies the size of the flame from a tiny bubble to full flame, as dictated by return air temperature, ***not bonnet temperature.***

For better performance . . . trouble-free installations . . . and customer satisfaction, concentrate on Mueller equipment—because Mueller has everything.

MUELLER'S line of gas-fired equipment for small and large homes, industrial and commercial needs, includes: gravity and air-conditioning type furnaces; boilers for steam and hot water application; floor furnaces; and unit heaters.

MUELLER (M) MILWAUKEE

HEATING AND AIR CONDITIONING

Paul D. Miller, for six years salesman for the Ohio Fuel Gas Co., in Circleville, Ohio, will now be located in Zanesville, Ohio, as supervisor of the Cambridge district.

A. S. KINCAID

A. S. Kincaid, southern representative of the Ward Heater Co., Los Angeles, for the past seven years, has been elected to the board of directors of the company and appointed southern manager, according to announcement by R. G. Logue, vice president and general manager.

Mr. Kincaid's new duties will take him throughout the South as far east as the Atlantic Seaboard. He will continue to make his headquarters in Dallas, Texas, where the Ward Heater Co. has a direct factory representative, L. M. Taylor, who handles the central Texas district, served by the Lone Star System.

Clifford McKay, manager of the Gulf Cities Natural Gas Co. at Silsbee, Texas, won the Frank C. Smith cup for 1939 with the best record of sales of ranges, water heaters, refrigerators, and floor furnaces. Fifteen districts were competing for the cup and award.

Virginia Shoop Hall has been announced as the new home service director of the Raleigh (N. C.) Gas Co., and the Durham (N. C.) Gas Co. Miss Hall was formerly home service director of the Roanoke (Va.) Gas Co. **J. W. Willingham**, now sales manager of the Raleigh Gas Co., was recently associated with the Roanoke Gas Co., and **A. J. Westcott** has been appointed sales manager of the Roanoke Gas Co. Prior to his appointment, he was division engineer of the Hagerstown (Md.) Gas Co. **Elma B. Willis** has been appointed home service director for the Asheville (N. C.) Gas Co.

George S. Hawley, president of the Bridgeport (Conn.) Gas Light Co., was recently honored in an address by **W. Gibson Carey, Jr.**, president of the U. S. Chamber of Commerce.

D. H. Perkins, general superintendent of San Diego Consolidated Gas & Electric Co., San Diego, Calif., has been appointed general chairman of the annual convention of the Pacific Coast Gas Association, which will be held in Coronado, Calif., Sept. 18-20, it has been announced by Clifford Johnstone, managing director, P.C.G.A. Appointment was made by A. E. Holloway, president.

John McDoyle Hood, commercial sales supervisor of United Gas Corp., Houston, Texas, was recently appointed commercial sales director of the Houston division. Mr. Hood joined the company in 1918 as a pipe fitter's assistant. He succeeds **Harry W. Presseur** who has been named air conditioning and heating specialist.

J. Woodward Martin, sales manager of the Lone Star Gas Co.'s Stargas Department, was reelected president of the Liquefied Petroleum Gas Association at the annual convention at Cincinnati. Mr. Martin is the fourth president of the eight-year-old organization.

Alta Ewalt Evans was recently appointed director of the newly created advertising and employes' relations division of the Southern Union Gas System, located in the Burt Building, Dallas, Texas. Mrs. Evans has been employed by the company in a secretarial capacity for more than 10 years and has edited the company's house organ, *Southern Union News*, since its creation in July, 1934.

MRS. A. E. EVANS

The new department will handle all of the advertising for the Southern Union Utilities Co., Arkansas Western Gas Co., New Mexico Eastern Gas Co., New Mexico Gas Co., and the Quanah Water Co., operating companies of the Southern Union Gas System, serving an aggregate of 44 towns in South Texas, West Texas, Oklahoma, Arkansas and New Mexico.

C. J. Webber, former vice president of the Arkansas City Retailers Association, was recently elected president of that organization. Mr. Webber is chief clerk of The Gas Service Co., at Arkansas City, Kan.

William E. Hill, district manager of the North Penn Gas Co., Wellsboro, Pa., has resigned. He will be succeeded by **Ezra Dexter**, of Canton.

Chester A. Thomas, district manager of the Southwest Natural Gas Co. at Holdenville, Okla., has been promoted to production superintendent in charge of the company's gas well drilling. Mr. Thomas, who has been with the company for 13 years, will establish headquarters in New Iberia, La.

J. E. Dupont, Jr., service man at Crowley and Rayne, La., for the United Gas Corp., has been promoted to the service department in Beaumont, Texas, it has been announced by Bob Collings, district manager. **Owen Dupont** has been transferred from Jennings to Crowley to replace J. E. Dupont, Jr.

Jack Torbert, new business manager of the Wyandotte County Gas Co., Kansas City, Kan., has been recently elected president of the board of directors of the local Community Chest for 1940.

Dan R. Hiskey, for 18 years a chemist with the Southern California Gas Co., Los Angeles, has resigned his position to join the Dearborn Chemical Co., Chicago, as technical salesman. While connected with the Los Angeles utility, Mr. Hiskey was primarily interested in work on pipe protection and soil testing. **A. C. Alter** will succeed Mr. Hiskey at the Southern California Gas Co.

Frank R. Phillips, president of the Philadelphia Co., Pittsburgh, Pa., was recently elected president of the Pittsburgh Convention and Tourist Bureau, Inc. for the coming year.

Otto C. Voss, of Milwaukee, Wis., a superintendent in the Allis-Chalmers plant, and an authority on the oxy-acetylene process, has been presented the 1939 James Turner Morehead Medal, sponsored by the International Acetylene Association, it was announced recently by the secretary of the Association. The medal is awarded annually for outstanding work in the production or utilization of calcium carbide and acetylene.

Quiet AND Quick

KLIXON CONTROLS FOR HEATERS

One thing about Klixon gas valves — THEY'RE QUIET. No hum, chatter, sticking. No solenoid troubles. For these valves are thermally-operated by a snap-acting Spencer Thermostatic Disc.

Teamed up with Klixon Heat-Accelerated Snap-Acting Room Thermostat, you have a smooth-working control combination that provides uniform temperatures with complete satisfaction.

Valves range from 3/8" through 1 1/4" I. P. S. with 1000 cu. ft. capacity. Room Thermostats in several attractive finishes. Send for complete information.

KLIXON

SPENCER THERMOSTAT CO.
Attleboro, Mass.

MONO-CAST DOUBLEX SIMPLEX PIPE

More than 7,000,000 feet of permanent Mono-Cast Doublex Simplex Pipe are now giving 100% satisfactory service in gas transmission and distribution lines, under pressures ranging into hundreds of pounds. No welding, coating, wrapping, or skilled labor required. Lowest construction and maintenance costs. Write for detailed literature.

AMERICAN CAST IRON PIPE CO.
BIRMINGHAM, ALA.
Dallas Houston El Paso Pittsburgh Kansas City
Chicago Minneapolis New York City Cleveland
Los Angeles San Francisco

Pacific

All Types GAS HEATING APPLIANCES FOR EVERY NEED All Sizes

"OUT IN FRONT" IN WORLD'S FASTEST GROWING INDUSTRY

Gas Fuel Keeps Heating Salesmen Busy Twelve Months of Year

ONE prominent gas company official says, "By actual survey, our territory is good for 100,000 Floor Furnace installations. Real selling will help us win this rich fuel market." Still another states: "Our policy is to push the lines of leading appliance manufacturers." Pacific's 27 successful years manufacturing gas heating appliances exclusively assure customer satisfaction.

JUST OUT!

Pacific Thermolator in vented and unvented models, both AGA approved. Sizes from 12,000 to 60,000 BTU input. New features. Ready now for spring and summer campaigns. Write for new literature!

GRAVITY AND BLOWER GAS FURNACES MEET LATEST A. G. A. REQUIREMENTS

Mighty strict . . . these new A.G.A. approval requirements! But here's Pacific with a new full set-up . . . gravity and blower furnace models that meet the most rigid specifications. Types and sizes for all needs.

Finest yet . . . furnace and blower combined in attractive cabinets. All parts fully enclosed. Beautiful finishes and trim. Most modern controls, including electric panel board which simplifies installation and wiring.

New gravity furnace with double wall outer casing, inner shielded round heating element, multi-tubular burner . . . a marvel of efficiency and low cost.

NEW "EVERLAST" CAST IRON FURNACE. Sectional fin-type cast iron radiation element and burner box combined . . . built-in blower with fully automatic controls . . . this is the winter-summer Air-Conditioner for heavy duty in extreme climates!

Complete self-contained forced-air unit for hall, closet or porch . . . any first or second floor location in buildings without basement.

Here is the ideal replacement unit for switching old house gravity jobs to modern forced-air. Fits in low ceiling basements. All the famous Pacific quality at a price!

Utilities Launch Drive to Rid Homes of Old-Fashioned Heating Appliances

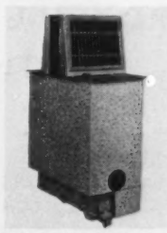
The drive is on for *vented* gas heating appliances! In old house districts, owners feel the impact of convincing sales arguments for *vented* floor furnaces. And why not? Floor furnace heating equals basement furnace efficiency with low cost installation and operation . . . has all the modern advantages of fully automatic controls.

Pacific Floor Furnace offers many "surprise" features. See the latest catalog literature!

New Air-Insulated Wall Register Models

SINGLE WALL REGISTER

Never before such simplicity of installation . . . such all 'round convenience! By all means see this new Single Wall Register model. Study its features and wider adaptability to your needs.



DUALWALL REGISTER MODEL

"Heats two rooms for the price of one." Properly sized for residential requirements. New fabricated steel grilles are more efficient. Furnace is replete with new selling features.

New Stocking Plan -- Interchangeable Controls

Think of this! With TEN standard types and sizes, THREE Interchangeable Burner packages, and TEN Interchangeable Control packages (complete manifold assemblies) you can supply, right out of stock, 300 *different Floor Furnace Models* complete . . . the RIGHT SIZE, the RIGHT BURNER, and the RIGHT CONTROLS for the job . . . no matter how "special" the owner may try to make it!

Complete details of this new and spectacular PACIFIC plan are available for the asking. The plan reduces stock investment, simplifies installation, assures the owner a properly sized and properly equipped Floor Furnace installation every time.

Keep abreast of the times by investigating these new furnaces now. With them you can make floor furnace merchandising history!

KEEP POSTED

on Pacific products and prices. 27th successful year . . . and *still growing!*

PACIFIC GAS RADIATOR CO.

(Dept. G-5)

Main Office and Factory . . . HUNTINGTON PARK, CALIFORNIA

150 Page Catalog Free

Full product data with specifications and illustrations on the complete Pacific Line. Ask for it on your company letterhead TODAY!

O. J. Wolfram, office manager of the Philadelphia Co., Pittsburgh, has been elected assistant treasurer of the Philadelphia Co. and its subsidiary companies, it has been announced by H. D. Megahan, treasurer. Mr. Wolfram joined the company in 1904 as a stenographer, was named chief clerk of the treasury department in 1919, and in 1927 was appointed office manager. During the World War, he served in the U. S. Army with the 606th Engineers.

Conrad N. Lauer, president of the Philadelphia Gas Works Co., was conferred an honorary degree of Doctor of Laws by the University of Pennsylvania. Mr. Lauer is past president of the American Gas Association, and an active leader of the gas industry. The citation, read by the president of the University, stated, among other points, "Master of engineering theory and mechanical techniques, and a great organizer of commercial enterprises."

C. N. LAUER

Bruce Cunningham, former editor of *Blue Blaze News,* house organ for the Lone Star Gas Co., Dallas, has been promoted to the advertising and public relations department to do general publicity and special assignment work, it was announced recently by Will C. Grant, advertising director. **Claribel Thompson** of the advertising department has been named to succeed Mr. Cunningham as editor of the monthly paper. Mrs. Thompson joined the advertising department in 1937, contributing to *Blue Blaze News* and writing special stories for newspapers throughout the system. She has also written copy for several special gas appliance sections for Dallas newspapers.

Roy E. Pendleton, employed in the accounting department of Community Natural Gas Co., Dallas, Texas, has been appointed chief clerk of that department and first assistant to G. O. Tribble. Mr. Pendleton joined the company in 1927.

Carl A. Renz, superintendent of customer service of the Southern California Gas Co., Los Angeles, has recently been named an advisor for customer service policies throughout the entire system. in addition to his former position. **Elting Henderson,** superintendent of distribution for the suburban divisions, has been appointed assistant general superintendent of distribution for the entire system of the Southern California Gas Co. In his new position he will have charge of the street department throughout the system, and will have supervision over the meter shops in Los Angeles and in the suburban divisions.

G. S. Dawson, of the British Columbia Electric Railway Co., Vancouver, B. C., has been given the title of supervisor of gas sales. His former title was merchandise sales engineer. Mr. Dawson will give general supervision to all operations that come within the scope of the gas sales department, supervising industrial and heating salesmen and also gas fitting and gas service, it has been announced by W. C. Mainwaring, general sales manager.

One of the Central Illinois Electric and Gas Company advertisements designed to awaken the consumer's appreciation of the preliminary steps necessary before service is available in the home.

ARE YOU GETTING YOUR FULL SHARE OF THE MASS HOUSEHEATING LOAD?

The type of equipment you're offering will determine your answer. That's why it's so important for you to campaign **Peerless** Gas-Fired Circulators. Wherever offered, these fine Circulators have won a large consumer acceptance. Plus a correspondingly large **permanent** househeating load for gas.

You sell HEALTH . . COMFORT . . CONVENIENCE when you sell **Peerless.** Automatic controls if desired, assure even temperature without fuss or bother.

All of the outstanding features of Circulator design and construction—the results of many years' exhaustive research and perfection-minded testing—are contained in Peerless Circulators.

Available in many styles and sizes ranging from 20,000 B. T. U. to 60,000 B. T. U. Write for complete details TODAY.

No. 7741

PEERLESS MANUFACTURING CORP.
LOUISVILLE, KENTUCKY

Central Illinois Utility Stimulates Good Will

A publicity campaign, entitled "Behind the Scenes," is being conducted by the employes of the Central Illinois Electric & Gas Co., Rockford, Ill., to acquaint Rockford consumers with the utility service being rendered. Prepared by Bozell & Jacobs, Inc., Chicago advertising firm, the campaign is designed around the employes themselves and features photographs of several hundred members of the organization. According to Donald C. McClure, president of the Central Illinois utility, the campaign is building much good will in Rockford.

■ ■

Texas Reserve Estimated At 50 Trillion Cu. Ft.

Natural gas reserves in the state of Texas total 50 trillion cu. ft., it was estimated recently by W. R. Woolrich, dean of the bureau of engineering of the University of Texas, in an address broadcast from Austin. Dean Woolrich described natural gas as "The answer to an industrial prayer," and predicted that when the present supply is exhausted, gas will be taken from the reserves of 23 billion tons of Texas lignite.

■ ■

Lynchburg Gas Co. Moves

Open house was held for three days by the Lynchburg (Va.) Gas Co., to celebrate moving into its new offices. The new building has an attractive showroom for displaying has a showroom for displaying appliances and an auditorium for demonstrations.

STOP 'EM TELL 'EM SELL 'EM

PLEASE 'EM

with the New ROPER GAS RANGE

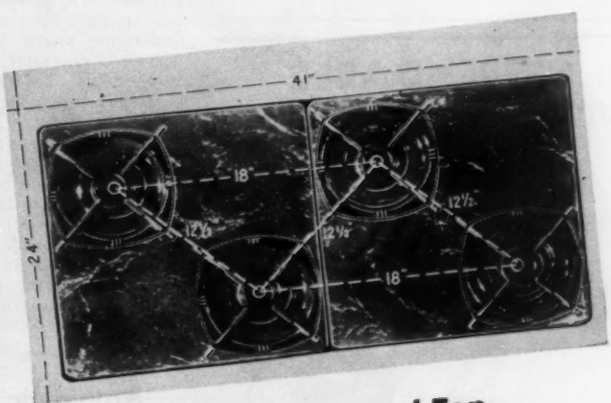
Vagabond Sale

Everything Needed for Summer Selling

A novel hard-hitting plan for Summer Sales Volume and Summer Profit. It's complete with folders, newspaper ads, displays, contests, everything. Write today.

Feature "Peasant-Ware" Broiler with Serve Tray

Here is one of the most potent sales tools you can use. It's new, interesting, practical. Provides an ideal means of broiling. Then lets Milady serve broiled foods piping hot from the grill and serve tray.



Feature Staggered Top for More Cooking Space

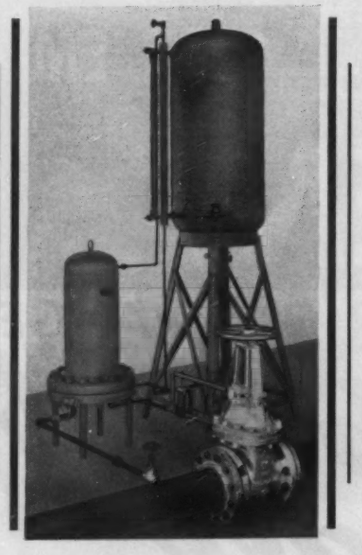
An exclusive Roper feature. Provides plenty of room for 4 large utensils. No crowding. No hot utensil handles. Most convenient cooking top ever devised. Popular with housewives from coast to coast.

GEO. D. ROPER CORPORATION

GENERAL SALES OFFICE AND PLANT: ROCKFORD, ILLINOIS

Chicago: 343 So. Dearborn Street; Atlanta: 901 William Oliver Building; Los Angeles: 2481 Porter Street; Philadelphia: 401 N. Broad Street; Newark: 110 Edison Street; Dallas: Santa Fe Bldg., Second Unit; Cincinnati: 626 Broadway; Oakland: 500 Kirkham Street; Cleveland: 2053 East 105th Street; Kansas City; Boston; Washington; Roanoke; Pittsburgh.

ROPER GAS RANGES ARE IDEAL FOR USE WITH ANY TYPE OF GAS, INCLUDING BOTTLED GAS



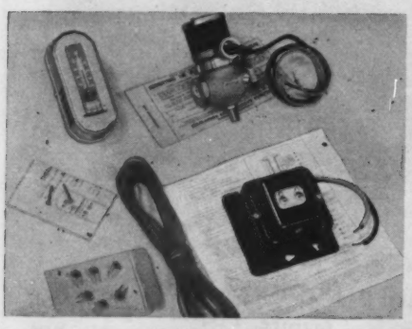
PEERLESS TYPE M-500#

ODORIZER

Accurate odorizing regardless of Temperature and Pressure Variations. Meter operated for Economy and Accuracy. New Pressure Compensator. Write

PEERLESS MFG. CO.
113 Murray Street Dallas, Texas

DEPENDABLE
***Automatic* GAS HEAT**
WITH



SERIES K
GAS CONTROL PACKAGE SET

Includes:

SERIES A SOLENOID VALVE
Quiet in Operation

MODEL 200 THERMASTER
Snap-Acting Heat-Anticipating Room Thermostat

TRANSFORMER, WIRE, FITTINGS

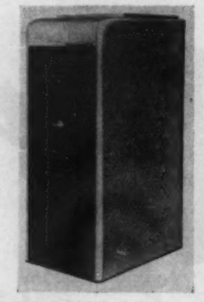
●

For Complete Information Write:

MILWAUKEE GAS SPECIALTY CO.
MILWAUKEE - WISCONSIN

MODERN *Appliances*

Forced Air Furnace



L. J. Mueller Furnace Co., 2005 W. Oklahoma Ave., Milwaukee, Wis.

Model: Series SHP.

Description: The new Series SHP gas-fired forced air furnace, designed for the home without a basement, yet can be installed in the home with a basement, may be vented through either right or left side of control compartment, or out the top. The design features a return air inlet at the bottom of the unit, allowing for under-floor return air duct and connections. The sturdy steel base angle also acts as a filter track when the air is taken in from the bottom. Provision is also made for return air inlet at either side, if desired. Everything is accessible upon the removal of the front door — diverter, motor, fan, controls, and the burner. If necessary, by the removal of two spring bolts, the whole fan assembly can be simply lifted out the front. The fan is mounted vertically and rests on a felt shield to eliminate any possible vibration noises. The fan and motor might be described as "floating power," for they "float" on spring bolts to take up any jarring action. The unit is completely enclosed in an attractive, modernly styled cabinet. The unit is available in three sizes having a B.t.u. input rating of 60,000, 80,000, and 100,000. All units are 24 in. wide, 34 in. deep, and 64 in. tall.

■ ■

Automatic Controller

The Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Model: T111 Chronotherm of 1940.

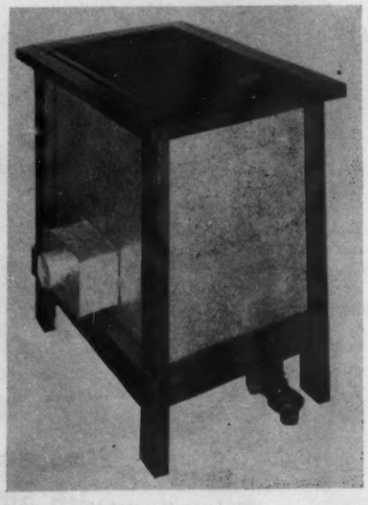
Description: The Chronotherm requires no winding, no setting, no manual attention of any kind. With its self-starting telechron electric clock to automatically lower the temperature at any desired time at night and to automatically restore the normal temperature at any time during the day, the new Chronotherm will pay for itself in fuel savings because actual operating tests prove every degree of lowered temperature effects savings of 3.2% per degree of lowered temperature during the time the temperature is lowered. Additional features of this instrument include: Self-starting clock of the latest numeral type to provide easy direct time telling and time setting; coordinated temperature indicator and thermometer in parallel arrangement for comparative reading; Da-Nite time recycling permits manual setting of temperatures at any time with automatic return to the regular time cycle at the next automatic temperature change; finger tip temperature setting by means of a red colored indicator plainly and easily marks the desired temperature; no oiling required because all parts requiring lubrication are sealed in oil; simplified installation due to a separate wall mounting plate, easily fastened to the wall, to which all wires are attached. The case of the Chronotherm is modern, small in size, and is finished in rich silver bronze.

■ ■

Gas-Fired Floor Furnace

John Zink Co., 4401 South Peoria, Tulsa, Okla.

Description: This floor furnace comes in three sizes — 25,000, 50,000, and 68,000 B.t.u. capacity. The pilot and main burner valve have a universal joint and thrust collar which prevent the valve core's being shoved



down into the valve too tight, regardless of the pressure on the valve rod. The manifold is heavily braced, and there is a flue pipe gasket which prevents the gas coming back into the furnace air. Equipped with full-length combustion chamber, the furnace burns manufactured, natural or butane gas.

■ ■

Kitchen Ventilator

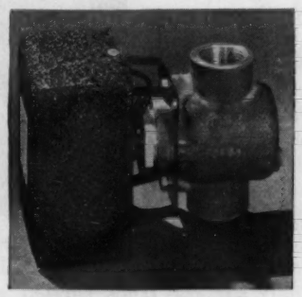
The Vent-A-Hood Co., 2808 Commerce St., Dallas, Texas.

Model: DeLuxe Vent-A-Hood.

Description: This ventilator is offered in four standard sizes. Venting on this model is through furring above the cabinet line; finish is white Dulux and trim is chromium; side wings are of heavy plate glass and of sufficient size to confine ventilation directly

to the range; back panels extend well below the cooking surface to protect back walls from splashing greases during the cooking operation. This company also offers two other models to take care of different kitchen arrangements; however, the ventilating qualities are the same as the centrifugal type exhaust unit, or may be installed in the conventional hood, displacing 325 c.f.m. By using the Vent-A-Hood and confining the ventilation directly to the range, the air displacement of 325 c.f.m. affects 18 air charges per minute in the area over the range and under the hood.

■ ■



Water Cut-Off

General Controls Co., 700 W. Ivy St., Glendale, Calif.

Description: This electric, low water cut-off is used for boiler mounting, supplementing the company's gage-glass mounting type. The model illustrated is designed for coal, oil or gas-fired boilers requiring 1-in. IPS connections and high pressure control. The cut-off can also be used on other applications than boilers within its maximum operating pressure of 150 lbs. and a maximum operating temperature of 366° F. A companion model is of such design as to permit screwing it directly into boilers, tanks, receivers or other pressure vessels within its 30-lb. maximum operating pressure and 275° F. temperature maximum. These cut-offs are free of moving parts, glands, or seals under pressure, and have small electrode chambers. Only moving part is armature and tube. Line and voltage models carry double voltage coils, permitting either 115- or 230-volt AC connection on the job.

■ ■

Washington, D. C., Co. Has 18th Annual Sales Gain

The Washington Gas Light Co., Washington, D. C., and its subsidiaries increased their gas sales for the 18th consecutive year, according to their 1939 annual report. Marcy L. Sperry, president, pointed out that the gain was largely due to the growth of population in the territory served, and by increased public demand and acceptance of gas for heating and refrigeration.

■ ■

Conservation of our natural gas reserves and conservation in the production, transmission and utilization of natural gas have been faced positively by the gas companies themselves, and the gas industry can pride itself on accomplishments in this regard during the past 10 years. The industry has encouraged sound conservation policies and has advocated sound conservation laws with proper enforcement.

Be sure with Fluor. Write today for valuable bulletin complete with descriptive information on Fluor Gas Cleaners. Available in two types—liquid remover type and dirt remover type. Both types 99.5% efficient. Handle all capacities, all pressures.

THE FLUOR CORPORATION LTD.
909 East Fifty-ninth Street, Los Angeles, California
New York City • Tulsa • Houston • Kansas City

FLUOR
GAS CLEANERS
•
Dirt Remover Type
Liquid Remover Type

NEW ENGLAND FORESTRY SERVICE, INC.
75 Federal Street
Boston, Mass.
•
Originators and Developers of
"Vegetation Method of Locating Gas Leaks"
•
Control your "unaccounted for" by locating leaks the economical and speedy way. *Costs about $2.00 per mile.*
"Trees, like humans, respond to proper care" © *1935*

"Progress Exposition Week" Is Novel Promotion of Hartford Gas Company

"THE Hartford Gas Progress Exposition Week," a novel promotional activity running March 9 through the 16th, was a recent load building campaign of the Hartford (Conn.) Gas Co.

The Hartford system has only 55,000 customers, but as a result of this week's activity succeeded in adding 449 new gas appliances to their lines in six days. The new appliances included 149 gas ranges, 160 gas refrigerators, 121 automatic gas water heaters, and 19 automatic gas house heating installations. This achievement was accomplished by 23 sales persons, backed by the well-planned and coordinated gas progress promotion.

In describing the background of the promotion, Charles W. Kimball, supervisor of sales promotion, highlighted two basic objectives: the first, stimulating and properly advertised promotion which would bring people to the sales floor; and, second, a bettering of customer relations as a result of the educational work of acquainting more people with the inside story of their gas company.

To tell the story to the 72,000 readers of the magazine supplement of the *Hartford Times*, a carefully edited eight-page picture and text presentation of gas company activities was prepared for the issue of March 9. The editorial copy was purely institutional and free of any merchandising suggestions. Little-known facts of general interest regarding the making of gas, its distribution, the handling of service requests, and the extent of operations were all described. This supplement was prepared by newspaper men.

One of the leading announcements of the opening gun of the campaign was an "Open House Week in Home Service." Every day during the exposition week, some nationally known guest artist conducted demonstrations in the all-gas kitchen in the company auditorium. This stimulated attendance and interest. Every person coming to the sales floor during the week received an admission ticket which qualified him to win a prize. In addition to this, every person buying a major gas appliance received one purchase award coupon for each purchase of $5 value. Thus, a person buying a $100 appliance had 20 chances to win that appliance for nothing.

On the final night of the exposition the judges awarded successful contestants (on the basis of a brief written statement in which each told why he preferred a certain gas appliance) the following merchandise: five CP ranges, two gas refrigerators, two automatic gas water heaters, one gas conversion house heating burner, one Monel 60-in. cabinet sink. The metal sink was given to a contestant who had purchased an automatic gas water heater, and was used as a plumber tie-in. The master plumber who produced the most sales or the most prospects resulting in the sale of automatic gas water heaters received $50 to cover the cost of the installation of the cabinet sink.

The promotion had a pronounced effect on employe relations, the activity being viewed as a full company endeavor to gain a common objective. Every phase of the week's activity was marked by a high degree of employe enthusiasm.

The advertising campaign supporting the activity consisted of 3x5 in. teaser ads March 4, 5, 6, and 7; a double truck announcing the merchandising offers, guest artists and prizes on March 8; and a special magazine section, an eight-page edition of the *Hartford Times*, March 9.

During the week daily merchandise ads were run in all papers covering offers. A 60-foot billboard carried an Exposition Week tie-in. Full showings on trolley cars and buses were carried in double-sized car cards. Three local radio stations carried spot announcements and feature programs. Every company car and truck carried a special sign featuring "$2000 in Grand Awards" and other phases of promotion. Special bulletins starting 10 days ahead of public announcements were sent to all employes, dealers and plumbers, and invitation letters from the home service department and special sales letters from salesmen to prospects were mailed out.

H. R. CARLSON

The promotion was under the direct personal supervision of President Norman B. Bertolette, Sales Manager H. R. Carlson, and Sales Promotion Supervisor Charles W. Kimball.

Bright banners and shining appliances lighten the display rooms of the Hartford Gas Co. during the company's "Hartford Gas Progress Week."

Prizes Offered by Payne For Name of New Unit

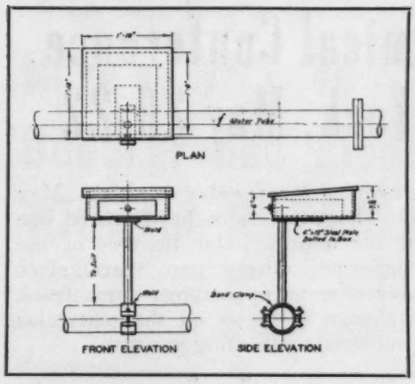
A new, unnamed forced air heating unit of special design is to be shown for the first time at the Payne Furnace & Supply Co.'s exhibit at the Home Show to be held in connection with the A.G.A. Natural Gas Section Convention in Houston, May 6-10, it has been announced from the company's headquarters in Beverly Hills, Calif. A contest to name the new unit will be conducted at the Show, and several cash prizes will be awarded. Entry blanks and details will be supplied to A.G.A. members visiting the exhibit.

Kansas City Gas Co. Remodels

The Kansas City (Mo.) Gas Co. has completely remodeled the sales floor and basement of their Plaza office. The company has acquired a new room on the first floor, and additional basement space. The basement has been remodeled as a meeting room for salesmen, and a modern test kitchen installed in the rear for the home service department.

Gas Strike Opens New Field

A gas well, estimated at 21,000,000 cu .ft., on the Shelby Wright farm, just north of Owensboro, Ky., has opened a new field of production, according to press reports. The lease is owned by the Gulf Refining Co.



Detail of the chart desk used in United Gas Corp.'s orifice meter stations.

United Gas Corp. Uses New Type Chart Desk

THE desk shown in the above drawing was designed for use in orifice meter houses of the United Gas Corp., Houston, Texas. It is not economical to build meter houses sufficiently large to allow floor space for a desk and this design is particularly adapted for the purpose since it conserves space.

The primary advantage of this type desk is that it is fastened to the meter tube by clamps which may be removed when it becomes necessary to take down the meter tube for inspection or other purposes. This idea was suggested by C. A. Stewart, foreman of the Latex Section, Dallas District, and the desk was designed and developed by employes in the Latex Section.

■ ■

P. G. & E. Co. Extends Pipe Lines In Bay Region

The Pacific Gas & Electric Co., San Francisco, Calif., has applied to the War Department for a permit to lay an 8-in. pipe line across the Oakland estuary from the foot of Alice St. to a point 400 ft. east of Webster St., Alameda. The purpose of this proposed pipe line is to supply gas to the new Naval Supply Depot under construction in the Alameda district, and also to augment the service to commercial users in the adjacent areas.

The P. G. & E. has also secured a franchise from the Atherton town council to install 2730 ft. of 4-in. gas main in Atherton and Menlo Park, in San Mateo County, due to the large increase in home building and commercial expansion in these areas. The half mile of 4-in. gas main will tap the present 22-in. main supply pipe line in the foothills west of Atherton.

■ ■

Brooklyn Union Co. Conducts Water Heating Drive

The water heating drive currently being sponsored by the Brooklyn Union (N. Y.) Gas Co. has had 1685 water heater leads turned in in the first four weeks. Twelve-piece towel sets are awarded as prizes to employes who turn in two productive water heater leads. These are given in addition to the usual compensation of $4 for every productive lead. David Hunter, Flatbush contract clerk; William Glynn, Queens District, and Frank Lowe, Customers' Service, were the first three, respectively, to win a towel set. During the first four weeks, 423 employes turned in at least one water heater lead.

Efficient NATURAL GAS PURIFICATION *at Lower Cost*

Connelly IRON SPONGE

THE effective removal of hydrogen sulphide from natural gas is now possible not only at a low initial cost, but low maintenance cost as well.

Connelly Iron Sponge — a patented product of extra high capacity — meets every requirement. Its extremely high capacity permits handling sour natural gas for long periods without revivifying the sponge. Purifying costs are reduced to near zero, and no trained help is required.

The amazing simplicity and low cost of Connelly Natural Gas Purification is demonstrated in leading plants thruout the country.

Write us for full information about this new sponge, and send us your purifying requirements.

NOTE

If you have a sulphur problem in Natural Gas purification, consult Connelly first. With a background of 65 years' experience in the development of materials and equipment for gas purification, Connelly engineers are equipped to analyze your problems and make unbiased recommendations. Submit your requirements—there's no cost or obligation for this service.

CONNELLY IRON SPONGE & GOVERNOR CO.
CHICAGO, ILL.—ELIZABETH, N. J.

SEMET-SOLVAY ENGINEERING CORPORATION

Blue Gas Plants
Water Gas Machines
Washer Coolers
Naphthalene Scrubbers
Gas Purifiers
Condensers
Waste Heat Boilers
Producer Gas Plants

40 RECTOR STREET, NEW YORK, N. Y.

GAS—1709 W. 8th Street, Los Angeles, California

Yes! SEND ME GAS

for 3 Years at $2.00

SUBSCRIPTION RATES: United States, Canada, Mexico and Central American countries (in advance), three years $2.00; all other countries, $3.00 per year.

Name..... Position.....
Company.....
Address.....
City..... State.....
☐ Check enclosed ☐ Send bill

ELIMINATE CONDENSATION TROUBLE

VITROLINER
—the permanent chimney lining that totally eliminates chimney deterioration caused by acid-bearing moisture deposited by all types of fuel. Made of Armco Ingot Iron, vitreous enameled both inside and out.
Also manufacturers of Condensation Eliminator and Howle Heat Extractor. Write for free condensation folder and price list.

CONDENSATION ENGINEERING CORPORATION
2515 Archer Avenue - - Chicago, Illinois

GASAIR

GASAIR MIXERS AND VAPORIZERS
150 to 50,000 C. F. H. Capacity

•

GASAIR VAPORIZERS
For Straight Vapor Installations

ELIMINATE UTILITY & INDUSTRIAL SHUT-OFF

"The Only Complete Gas-Making Unit Operating Without Outside Power"

•

GASAIR CORPORATION
John K. Heller, Pres.
155 Sansome Street, San Francisco
Telephone YUkon 1435

STANDBY

Production and Chemical Conference Scheduled for New York, May 20-22

THE Joint Production and Chemical Committee Conference of the American Gas Association, to be held at the Hotel Pennsylvania, New York City, May 20-22, will bring to the fore various problems of interest to the industry's production and chemical men. The program is being arranged under the direction of S. J. Modzikowski, The Peoples Gas Light & Coke Co., Chicago, chairman of the Chemical Committee, and W. K. Beard, of The Philadelphia Gas Works Co., chairman of the Gas Production Committee.

Featured speaker at the opening session will be Arthur E. Pew, vice president, Sun Oil Co., Pa., whose topic will be "Effect of Marketing and Refining Methods of the Oil Industry on Future Availability of Enriching Oils." A.G.A. President W. C. Beckjord and Managing Director Alexander Forward will also speak.

The tentative program for the three-day conference includes the following papers sponsored by the Chemical Committee:

"Determination of the Cause of Pilot Outage," W. L. Shively, Boston Consolidated Gas Co.; "Influence of Pilot Design on Tendency to Outage," the A.G.A. Testing Laboratories; "Comparison of Different Packings in Absorption and Stripping," Prof. C. C. Furnas, Yale University; "Motor Fuel from Coke Oven Light Oil," B. J. C. Van der Hoeven, Koppers Co.; "Living Organisms in Dry Box Purification of Manufactured Gas," Dr. G. E. Seil, E. J. Lavine & Co.; "Evaluation of Purifying Material," J. W. Penney, Jr., Boston Consolidated Gas Co.; "Further Developments in the Determination of Water Vapor in Gaseous Fuels," Dr. A. W. Gauger, Pennsylvania State College; "Empirical Relation Between the Physical Characteristics of an Oil and Its Yield as Determined by a Cracking Test," W. F. Kugel and E. M. Bliss, Public Service Electric & Gas Co.

The Gas Production Committee will sponsor the following papers:

"Foundry Coke," B. P. Mulcahy, Citizens Gas & Coke Utility; "Coal Expansion," V. J. Altieri, Eastern Gas & Fuel Associates; "Recovery of Light Oils from Coke Oven Gas," William Tiddy, Director of Research, and M. Miller, Semet-Solvay Co.; "High B.t.u. Gas as Made by the Refractory Screen Process for Mixing with Natural Gas or as a Substitute for Natural Gas," H. M. Blain, New Orleans Public Service, Inc.; "Theoretical Advantages of Low Air-Steam Ratios," J. Hawley Taussig, Philadelphia Gas Works Co.

The series of round table luncheon meetings will again be held this year, scheduled for Tuesday afternoon, May 21. These luncheons have proved one of the most popular features of the conference during past years, since they offer an opportunity for a frank exchange of views on the particular problems confronting gas men.

■ ■

Best Copy Contest Ads to Be Shown at PUAA Meeting

The annual convention of the Public Utilities Advertising Association will be held in Chicago June 23 to 26 with the Palmer House as headquarters, according to an announcement by Keith Hartzell, of Bristol, Tenn., president of the association. The convention will be held in conjunction with the annual meeting of the Advertising Federation of America, scheduled for the same dates.

Mr. Hartzell also announced appointment of the committee on arrangements for the convention, with Clayton G. Cassidy, The Peoples Gas Light and Coke Co., Chicago, as chairman, and Charles W. Tennant, Western United Gas and Electric Co., Aurora, Ill., as vice-chairman.

A feature of the utility meeting will be an exhibit of advertisements winning awards in the association's nationwide Better Copy Contest. J. W. Hicks, of the Public Utility Engineering and Service Corp., Chicago, is chairman of the committee in charge of the exhibit.

■ ■

Gas Exhibits, Inc., Gratified At Industry's Support

Contributions from gas utilities and manufacturers of gas appliances and equipment are enabling Gas Exhibits, Inc., New York, to stage a much larger and more spectacular gas industry exhibit at the New York World's Fair this year, it has been announced by Hugh H. Cuthrell, president of the sponsoring organization. The original "Court of Flame" exhibit of last year is being converted into "Gas Wonderland" for this year's Fair. Mr. Cuthrell further praised the several companies who have already contributed to the fund for their cooperation.

According to estimates of Gas Exhibits, Inc., membership in the Court of Flame Club this year is expected to be much larger than that of a year ago.

■ ■

New York Fair Buildings Gas-Heated In Cold Wave

During the six-month period from Oct. 1, 1939, to March 31, 1940, outstanding in the gas industry because of its severe cold waves, 221,000,000 cu. ft. of gas were sold to the New York World's Fair Corp. to heat 58 buildings, it has been reported by Stanley B. Finch, World's Fair coordinator for the gas industry. Since the beginning of the exposition, a total of 630,000,000 cu. ft. of gas have been used. According to Mr. Finch, gas-fired unit heaters are being used successfully in several buildings on the fairgrounds.

Here's WHY You Can Reduce Your Underground Pipe Installation Costs With the GREENLEE PIPE PUSHER

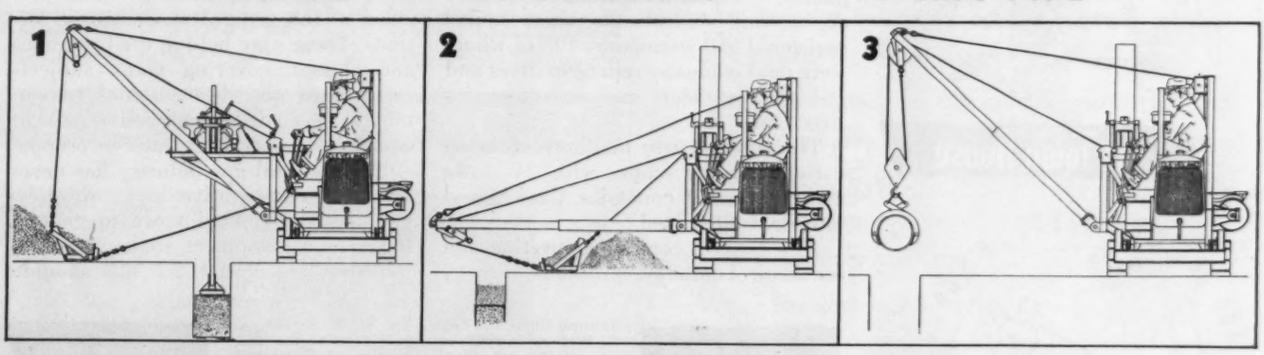
1. It eliminates costs of digging and tearing up of lawns and pavements.
2. The powerful hydraulic unit does the actual pushing so that one man can easily develop the pressure needed.
3. Because only one man is required to do the pushing, you need fewer men on the job.
4. It will do the job faster because the Hydraulic Unit has 8 speeds for varying soil conditions.
5. It is compactly built so that it can be easily and quickly carried to the job and set up.

Write for Complete Details

GREENLEE TOOL CO., 1700 Columbia Ave., ROCKFORD, ILLINOIS

THE "CLEVELAND" Model 80—The Most Usable Machine You Ever Saw . . . Performs Not One, But Several Operations . . . DOES MORE WORK – SAVES MORE MONEY

IT TAMPS - IT BACKFILLS - IT LAYS PIPE



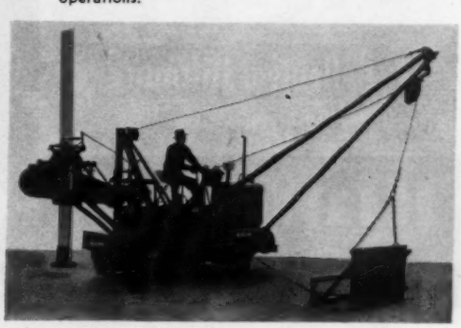
With the Model 80 you can replace as much or more dirt than was taken out. Machine operates astraddle of trench or 3½ feet from edge.

With the Model 80, in backfilling, you work from either side of the trench, either pulling in, or pushing in dirt.

Boom and cable winches of the Model 80 have been made extra strong, permitting handling and laying pipe, pulling sheathing and doing other light crane operations.

Never before has a machine of such great all-round utility been available. When you use it you'll wonder how you ever got along without it.

This Cleveland Model 80 is new — it's distinctive. It makes it possible for you to do more work and save more money on all your pipe-laying jobs. Write for specifications today.



THE CLEVELAND TRENCHER COMPANY

"Pioneer of the Small Trencher"

20100 ST. CLAIR AVE. CLEVELAND, OHIO

YOUR GRACIOUS HOST FROM COAST TO COAST

IN NEW YORK..

The Gotham

IN CHICAGO..

The Drake

The Blackstone

IN LOS ANGELES..

The Town House

IN BELLEAIR, FLA..

Belleview Biltmore

A.S. KIRKEBY, *Managing Director*

KIRKEBY HOTELS

The 8 A. M. registration rush in one of the class rooms on opening day of the Short Course. Thelma Jones and Dorris Lowery in charge.

Southwestern Gas Measurement Course Holds Sessions for 650 Registrants

By O. D. HALL

Staff Correspondent

THE Southwestern Gas Measurement Short Course concluded three busy days of sessions, April 18, with the largest attendance in the 17 years of its history. Held under the principal sponsorship of the college of engineering, W. H. Carson, dean, University of Oklahoma at Norman, with attendance confined principally to representatives of gas, oil and gasoline companies, equipment manufacturers and engineering students, the short course registered 650 attendants, 496 of whom were paid company representatives and 164 were students and university instructors.

The short course has become international in its scope, with 21 states and two foreign countries, Canada and Mexico, represented.

At a general committee meeting and luncheon Thursday, presided over by the newly-elected 1941 short course chairman, R. L. Rountree, United Gas Pipe Line Co., Shreveport, La., plans were made for further expansion of the short course. Equipment manufacturers and trade publication representatives were present upon invitation, to offer suggestions for improvements.

Fay C. Walters, Panhandle Eastern Pipe Line Co., Kansas City, Mo., retiring general committee chairman, presided at the general short course sessions. These were held in the forenoons and classes, covering many subjects relating to measurement and regulation of gas adjustment and repair of equipment, were held each afternoon.

"The natural gas industry has never been too conservative in its progress and has contributed more to general business development than any other industry," declared E. F. Schmidt,

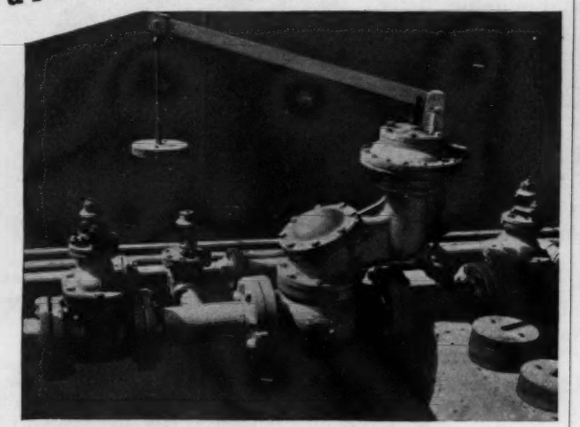
R. L. Rountree of the United Gas Pipe Line Co., Shreveport, La., and newly elected General Chairman of the 1941 Shortcourse, presides at a session.

Retiring Chairman Fay C. Walters introduces one of the meetings' two delegates from a foreign country, V. Ahel Trevino of Monterrey, Mexico.

Dr. W. B. Bizzell, as president of the University of Oklahoma, extends his welcome to the registrants at the Measurement Short Course.

A. F. Potter of The Gas Service Co., Bartlesville, Okla., introduces Dr. W. B. Bizzell, president of the University of Oklahoma.

Reliance Insures Perfect Gas Control



Reliance Regulators give safety, satisfaction and economy wherever they are used.

Safety, by providing positive shut-off of normal or emergency pressures, protecting appliances inside the property line.

Satisfaction, by insuring efficient combustion at uniform outlet pressures at all loads throughout the capacity range.

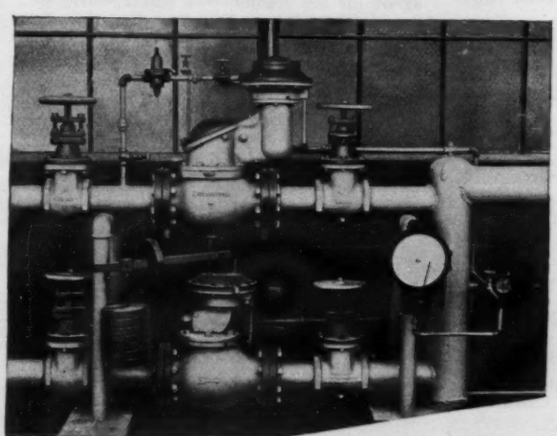
Economy, by accessibility of valve seat discs that can be repaired or replaced without taking the Regulator body off the line.

Get all three benefits at the same time by using Reliance Regulators for distribution, industrial and domestic control of any fuel gas—natural, manufactured or liquid petroleum.

SEND for BULLETIN

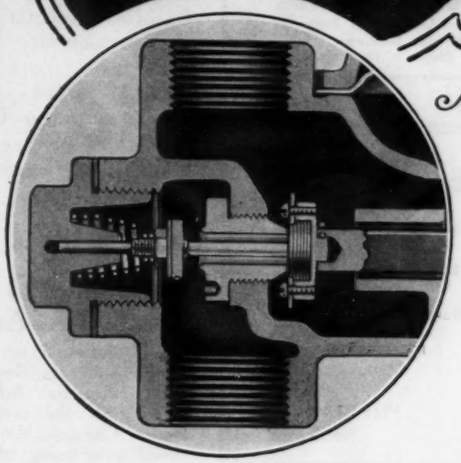
RELIANCE REGULATOR CORPORATION
1000 Meridian Avenue Alhambra, California

RELIANCE



Uniform Outlet Pressure Always

NOW! A PROVEN PRACTICAL AUTOMATIC Cut-off



AVAILABLE WITH

- *Diaphragm Operated Safety Valve*
- *Mercury Safety Seal*
- *Dead Weight Safety Seal*

☆ REYNOLDS' New Automatic Cut-Off prevents the passage of gas through the Regulator in case of failure of Inlet Pressure. It completely eliminates all danger from Inlet Pressure failures as the Regulator must be manually re-set.

Long, Removable Spring Type construction gives unusually sensitive regulation. Exclusive new Valve Pocket Design is a special feature. Increased capacity and efficiency make this new Regulator another REYNOLDS First.

Write for details about this new proven Safety Device.

REPRESENTATIVE . . .
Eastern Appliance Co.
Boston, Massachusetts

BRANCH OFFICES . . .
422 Dwight Building,
Mike Meuffels, *Sales Engineer*
Kansas City, Missouri
2nd Unit, Santa Fe Bldg.,
C. H. & C. B. Seidenglanz
Dallas, Texas
Wm. A. Ehlers, 268 Park St.,
Upper Montclair, N. J.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

Lone Star Gas Co., Dallas, Texas, and chairman, Natural Gas Section, A.G.A.

The attendants were warned against the Cole Bill in Congress, which proposes federal regulation of oil and gas production, by W. J. Armstrong, oil and gas conservation officer, Oklahoma Corporation Commission. He declared that the bill, if passed, will build up bureaucratic federal control of the oil and gas industry and practically end local control.

Other speakers at the general sessions and their subjects included: A. D. MacLean, Pittsburgh Equitable Meter Co., Pittsburgh, Pa., "Fundamental Principles of Displacement Meters"; A. F. Benson, American Meter Co., Inc., Erie, Pa., "Fundamental Principles of Orifice Meters"; Dr. W. B. Bizzell, president, University of Oklahoma, "Address of Welcome"; R. M. Scofield, Lone Star Gas Co., Dallas, "Report of Committee for Study of Practical Methods"; William F. Lowe, Tulsa, Okla., work of the "Natural Gasoline Association of America"; E. H. Poe, secretary, Natural Gas Section, A.G.A., New York, "Think and Learn"; Alex M. Brooks, The Chaplin-Fulton Manufacturing Co., "Fundamental Principles of Regulators," and R. L. Huntington, University of Oklahoma, "The Gas Phase of Retrograde Condensation."

■ ■

Committee to Discuss Plans For A.G.A. Advertising

T. J. Strickler, of Kansas City, chairman of the American Gas Association's Committee on National Advertising, has called a meeting of the committee at the Palmer House, Chicago, May 22, at which time national advertising plans for the fifth year, July, 1940, to June, 1941, will be approved. First announcement of these plans will be made by Major Strickler at the Association's Executive Conference in Chicago, May 23.

For some weeks members of the copy committee have been working with the agency, McCann-Erickson, Inc., New York, in developing material for the new advertising year. The last four-color advertisements in the current consumer series scheduled for publication in the *Saturday Evening Post* and six leading women's magazines, have been completed. On April 17 a new sales promotion portfolio was issued from New York, containing samples of reprints of the last three advertisements in the present campaign, a four-color blotter, metal display sign, two counter cards, six one-column newspaper mats and a photo-service sheet containing 21 photographs.

■ ■

Third Nation-Wide Contest Sponsored by Servel

For the third successive year a nation-wide contest is being sponsored by Servel, Inc., and Procter & Gamble, soap manufacturer, in which 360 Servel Electrolux refrigerators are being offered as grand prizes, it has been announced by George S. Jones, Jr., vice president and general sales manager of Servel, Inc.

The contest will be conducted from May 20 to June 30 on a weekly basis. Sixty Servel refrigerators and $3500 cash will be awarded each week during the six-week period. Residents of the United States and Canada are eligible to enter the competition.

Twenty-three gas companies have received Certificates of Award for leadership in sales performance during the first three months of the current year-round gas refrigeration sales drive sponsored by the A.G.A.

This loop in the line from the gas well to the separator absorbs expansion and vibration strains as high pressure flow tends to rack connections.

Pipe Loop Absorbs Flow Stresses at Gas Well

THE vibration and expansion stresses set up when gas wells with a flow pressure of 3000 lbs. per sq. in. are flowed can easily overload normal pipe, connections, and the well separator.

On one such series of high-pressure gas wells, feeding a main line distribution system after being passed through equally high-pressure separators, the well stresses are absorbed through the simple expedient of making a large loop (3 in. in diameter) in the flow line where it ties in to the well. This loop, supported in a vertical plane to prevent the fouling of any fittings, effectively damps any vibrations at the source, as well as provides an adequate expansion "joint" for relieving any strains set up by expansion or contraction of the flow line under temperature and pressure changes.

The loop is braced against overturning by means of a pair of guy wires, carried out to stakes well away from the well site.

■ ■

Two Long-Time Employes Of P. G. & E. Co. Pass

D. L. Thompson, Arroyo Grande, Calif., agent for the Pacific Gas and Electric Co., San Joaquin Power Division, died the early part of March at the age of 51. Mr. Thompson joined the company in 1925 as a service man, and had completed almost 15 years of service.

Bert Finney, 66, former gas and water superintendent at Selma, Calif., for the P. G. & E. Co., died March 12 at his home in Selma. Mr. Finney had been with the company since 1917, holding the same position until his retirement in July, 1939.

■ ■

ICC Approval of Pipe Lines Proposed in Congress

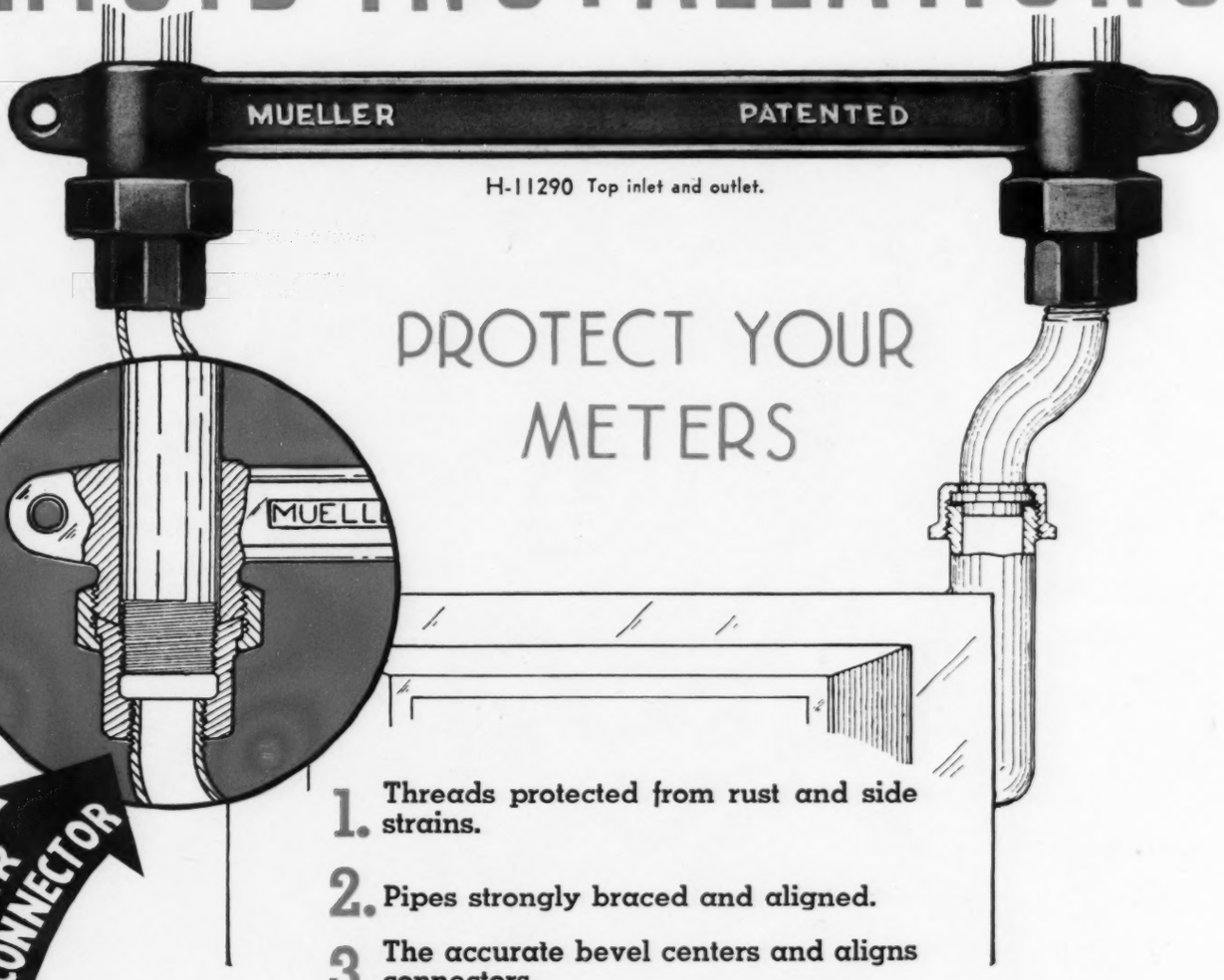
A bill affecting the construction of pipe lines was introduced April 11 in Congress by Senator Johnson of Colorado. The bill would require pipe line companies, which come under the jurisdiction of the Interstate Commerce Commission, to secure from the Commission certificates of public convenience and necessity before the construction of new lines or the extension of old ones.

ROBERT J. KUHN
Consulting Engineer
CATHODIC PROTECTION
Transmission Lines — City Networks
Electrolysis — Corrosion Surveys
Nationwide Service
1644 Canal Bank Bldg. New Orleans, La.

GEORGE A. BURRELL
Petroleum and Gas Engineer
Design—Construction—Reports
Suite 1909
20 Pine Street, New York City
1936-42 5th Avenue, Pittsburgh, Pa.

ENGINEERED TO UTILIZE EVERY BTU
Fraser Gas Heating Equipment takes to natural gas like a duck takes to water. It is engineered to get the greatest efficiency from every BTU.
Note these outstanding features:
1. Large, MULTIPLE, radiating surface of Armco Ingot Iron—assuring longer life, more uniform heat displacement.
2. Secondary radiation and famous Fraser heat trap for longest flue travel and greatest utilization of burnt gases.
3. Scientific expansion and contraction ribs that banish noise.
4. Rigid, floating, corrugated inside insulators.
5. Rubber assembly mountings.
6. "NO WHIP" motor pulley and fan sheave.
7. Balanced intake and output.
8. Oil and odor FREE cool air intake.
9. Constant gas pressure regulator.
10. A size and type for every heating need.
It's the inside of the Furnace that counts—builds customer satisfaction.
H. R. Basford Co. Distributors, San Francisco, Los Angeles
Fraser Furnace Co. Manufacturers, Stockton, California
FRASER
GAS HEATING EQUIPMENT

RIGID INSTALLATIONS



H-11290 Top inlet and outlet.

PROTECT YOUR METERS

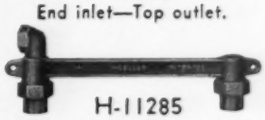
MUELLER BEVEL CONNECTOR

1. Threads protected from rust and side strains.
2. Pipes strongly braced and aligned.
3. The accurate bevel centers and aligns connectors.
4. Only two connections—no union joints or gaskets.
5. Accurate threading and precise dimensions.

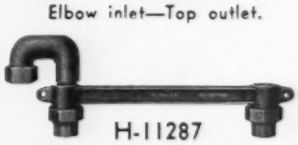
Mueller's new achievement in meter protection is the BEVEL CENTERING CONNECTOR. The bevel face on the bar is pulled together with the bevel connector at the pipe by means of a heavy hexagon nut. This forms a rigid connection of accurate registration and alignment which will withstand the strain of shifting or settling pipes because the threaded part, which is the weakest section of the pipe, is braced by the walls of the meter bar.

There are Mueller Rigid Bar Meter Connections for all types of piping arrangements. Write us for full information concerning your requirements.

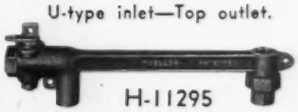
H-11280
End inlet—Top outlet.



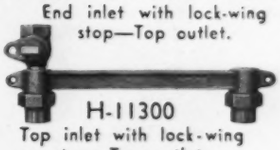
H-11285
Elbow inlet—Top outlet.



H-11287
U-type inlet—Top outlet.



H-11295
End inlet with lock-wing stop—Top outlet.



H-11300
Top inlet with lock-wing stop—Top outlet.

MUELLER CO.

DECATUR, ILLINOIS

S implicity of construction.

P arts interchangeable.

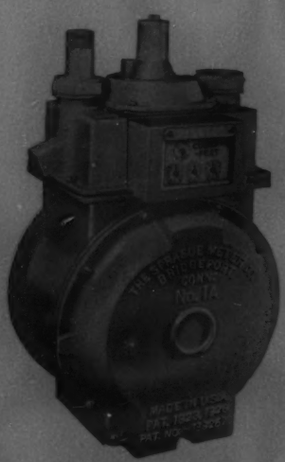
R educed operating costs.

A ccuracy in registration.

G ives satisfactory service.

U niform performance.

E fficient and dependable in manufactured, natural and Butane Gases.



THE SPRAGUE METER CO. BRIDGEPORT, CONN.